approach

VEMBER 1964 THE NAVAL AVIATION SAFETY REVIEW


NAVY
NAVY

TWILIGHT ZONE

by LCDR R. A. Wigent

A poem, a stink, a grating noise, a habit, a quality of delicate silvery light, a time to remember: chances are you have already been there . . .or part way at least

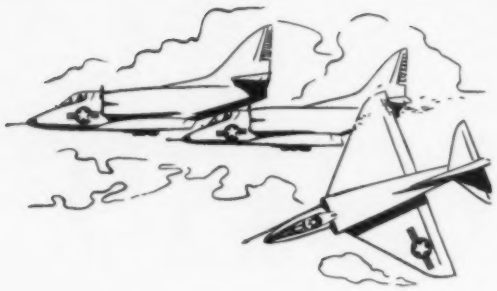
Early morning is a time of magic on ships at sea. It's a respite, a pause, a calm—the twilight zone of operations.

In the gray time after the light has come and before the sun has risen one can't help but pause a moment and reminisce over years past. One remembers faces, names, parties and incidents. Suddenly we connect a name with a face and then to an accident. "It was pilot error—remember . . . " then quickly dismiss the thought as fast as it came. "No—wait a minute! Pilot error? Old Joe just happened to be at the wrong place at the wrong time. I guess it was just one of those accidents that happens—no reason; it just happened." This is the obvious approach that many of us find as an easy expedient or excuse.

Let's pause a moment and look under the surface of pilot error.

Pilot error is a label which reflects that a pilot was in a position where his responses were just not good enough to cope with the situation. Fiscal year 1964 saw this label attached to 43.8 percent of the naval aircraft accidents. Although this is a large improvement over the previous years, 51.2 percent in '63 and 57.1 percent in '59, this is still a fertile field for improvement. (Who knows—you or I might even be included.)

Pilot error accidents have, at their roots, four basic sources or ingredients. These ingredients are found either singly or, more likely, combined in a deadly complex mixture or recipe resulting in a mishap. Let's look at the four basic ingredients in detail and examine some examples of each.



Attention

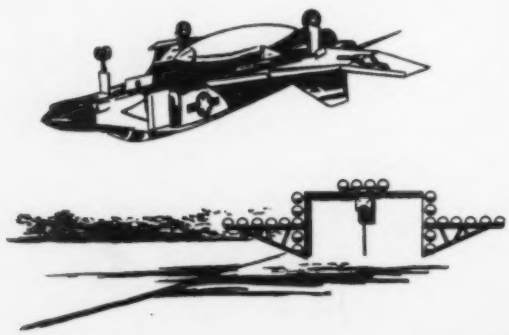
The first source of pilot error is attention. This is the degree of consciousness or awareness we have of our surroundings. Individual attentiveness is a spectrum which ranges all the way from a high degree of vigilance to a semiconscious daze where attentiveness is spotty or nonexistent.

Perhaps the most dangerous is fixation. The pilot concentrates his attention on an object or thing to the absolute exclusion of all others. This is the item that kills our best pilots since it seems to be an affliction of those who care the most and work the hardest for perfection. Let's examine some accidents in which fixation was a suspected pilot error factor.

• A pilot was joining a formation for the fourth time. He fell behind badly on the previous three joinups, so was concentrating extra hard on making this one a good rendezvous. During the joinup, he became so fixated on the leader that he had a midair with a wingman.

• After three waveoffs in the FMLP pattern the pilot overly concentrated on meatball corrections by making attitude changes alone. He completely ignored his airspeed and the aircraft stalled and spun.

• A second tour LCDR A-4 pilot had trouble keeping the ball from going out of the top of the mirror on the last four carrier landings. As a result, he had taken much ribbing in the readyroom. Determined not to get another bolter, he started spotting the deck. The closer he got to the deck, the more he concentrated on the landing area. Although his radio was working well he became so fixated that he didn't even hear the LSO's screams for power. The aircraft collided with the rounddown. The pilot was lucky—the bent-up A-4 caught the No. 1 wire and was arrested.

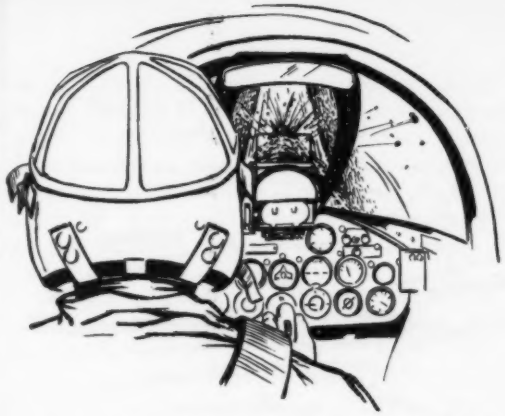


• During the Korean war a young jaygee on a recco route spotted a haystack driving down the road. He whipped the *Panther* up into a wingover and commenced a medium angle strafing run while his wingman covered. While pumping 20mm's into the moving haystack he became engrossed in the uniqueness of it all. Although he was hitting it, the haystack kept right on going. Determined and fixated, he went past the recovery altitude. When he realized that he was low, he horsed back on the stick—recovering at an extremely low altitude.

Back aboard ship his secret was safe until the plane captain discovered that the leading edges of the *Panther's* nose, wings and tip tanks was peppered with about 150 small dents—up to one-half inch in diameter. Although the pilot was unable to recall, it is believed that he was still shooting during his extremely low pull-out. The dents were believed to be from rocks and gravel kicked up by the 20s—which he had flown through. This was also substantiated by FOD damage found in the engine.

• Perhaps the best example is one of your own. Remember back when you were first learning to fly instruments? Remember how easy it was to "lock on" a single instrument—especially after getting chewed out for a mistake. What happened? *Right*—you concentrated on one instrument alone so that you wouldn't get chewed out again for the same mistake. As a result, everything else turned into a "can of worms" and LT India F. Romeo again sank his teeth into your hide to the chant of, "Scan! Scan! Scan!" Perhaps the echo of his voice is a little weak today; however, his message is still valid whether you are dive bombing, flying the meatball, joining a formation, trying to find a sub on a dark night, or just plain straight and level. In order to avoid fixation you can't afford to concentrate on any one thing—there are just too many other variables waiting to go wrong.

Another failure of attention can be observed in the daydreamer. Here's a gent that, although he is vaguely aware of his surroundings, is, for the most



part, unconscious. He simply "closes the gate" between his mind and his senses. As a result, his mind wanders into areas entirely unrelated to what he is doing at the time. He has diverted his attention to one of the reminiscence, family or social problems, the bed that's waiting for him upon return from a nine-hour flight, or painting mental pictures about how he would like things to be.

The trademark of the daydreamer is the glassy stare, abstract concentration and late reactions that are almost always inconsistent with the situation. No doubt we could all list a few symptoms.

Accidents resulting from this failure of attention are almost identical to the fixation type. The difference is that fixation occurs at times of extreme interest and daydreaming occurs primarily when a mission is so routine that complacency or boredom has set in. If fatigue is present, the susceptibility of the person is even more acute. While daydreaming, it is an easy matter for another airplane to "come out of nowhere" or for the airplane to churn miles past the omni station that was a planned turning point, or to miss important facts during a readyroom briefing. Here's an example where daydreaming led to an accident:

• An A-4 flight of five was returning to the ship. Since they had considerable fuel aboard and no way to dump, they descended to a low altitude for burndown. After a short time of maneuvering around at low altitude, the flight leader initiated a climb to a higher altitude. As the climb commenced, a wingman sighted and reported a flight of three A-1s ahead and about 4000 feet above them on a parallel heading. The flight leader acknowledged with a "Rog" and kept climbing without altering course. The A-1 flight leader, who was on the same radio frequency, had heard the report, sighted the A-4 flight and commenced a starboard turn to avoid them. At the time of impact, the A-1 flight had turned about 120 degrees to the right. The lead A-4 flew between the A-1 leader and his starboard wingman and collided with the other wingman. A split second prior to impact, the A-4 leader was observed to pull the nose of the aircraft up abruptly—but *too* late.

Perception

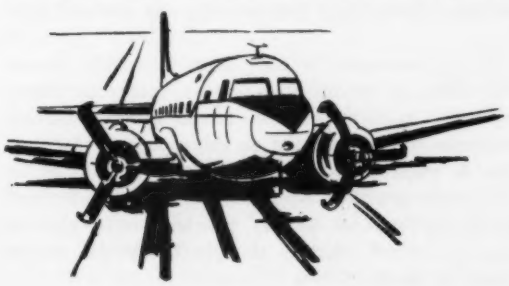
Perception is a ten-dollar word which is used to describe what we abstract from our surroundings by our senses. This includes many things such as light, sound, shape, odor, and others. We have at least 16 senses with which we interpret reality. Although we all have these senses, each of us uses them in different degrees or combinations to interpret a given situation. As we interpret the situation we react to it.

All of our interpretations are based on past experiences. As a result, we sometimes interpret reality on how we expect it to be rather than the way it actually is. We then react and make decisions on our own interpretations, invalid as they sometimes may be. Perhaps this is a bit difficult—let me illustrate. Tell three people to say the first thing that pops into their mind when the word "car" is mentioned. The bachelor Ensign would probably answer *Mustang* or *Sting Ray;* the family man, "station wagon"; and old granddad would answer, *Model T*. Here are three different mental interpretations of a simple word—all of which were preconceived ideas. Which one is valid? It depends upon who you are. Let's look at some examples as they apply to aviation safety:

• You are the copilot of a transport. Did the pilot say takeoff power or take off power? How we interpret that statement makes a great deal of difference.

• The transport rolled down the runway for takeoff. Did the pilot signal "thumbs up" to his crewchief because he wanted wheels up or did he signal because he recognized the crewchief was in a position to pull the wheels up. It cost the Navy two new engines and a couple of props to find out.

• The number two man in a four-plane F-8 flight



was quite dubious of his aircraft due to all the past repeat discrepancies on the yellow sheets. Although positive that he had a "dog," he accepted the aircraft anyway.

The preflight inspection and turnup was thorough and satisfactory. Although the aircraft checked out in all respects he still felt that something was going to be wrong with it.

About halfway down the 8000-foot runway, he heard a garbled transmission over the UHF. Although he couldn't hear who was calling who, he did hear, "Abort!" and something about hydraulic failure. That's all he needed. He immediately closed the throttle and tried to abort.

The tailhook missed the arresting gear and the aircraft rolled off the runway, shearing off the nosewheel in soft ground.

The actual emergency occurred in the second section. The garbled transmission was the number four man calling the number three man.

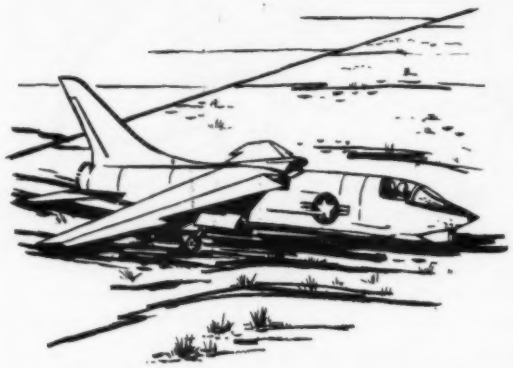
Very frequently we have preconceived ideas as to what is going to happen. Couple this with a hasty evaluation of a situation, crank in an incorrect emergency procedure and you have a perfect recipe for disaster.

Emotion

Emotion is the third area of pilot error. Emotion is an energy generating process which determines a person's capacity to appreciate his environment. It is a normal and necessary part of everyone's behavior. It allows us to love, hate, form attitudes and opinions, appreciate the beauty of contrails at 40 thousand, or to be proud of the accomplishments of our own children. Without emotion, we would be dull animated machines. We would see—then merely react.

Emotions are normally kept within limits by each individual. The older we get, the less emotion we tend to show—society calls this maturity. However, some individuals never mature and have extremes of emotion. Quite often this provides the seeds of pilot error.

Strong emotions in pilot error accidents present themselves primarily in two ways: *panic* or *anger*. In both situations, precise movements are difficult. Attention is concentrated on the source of the emotion to such an extent that one tends to forget or ignore the practical aspects of the situation. In both situations, emotion usually provides extra physical energy beyond what is thought to be the normal limits of the particular individual.



In panic, which is nothing more than extreme fear, a gravely hazardous situation is usually present from which there appears to be no escape. Sometimes the person is immobilized and no longer capable of any *effective* response. Quite often he will overreact or *respond* with a habitual reaction that doesn't fit the situation. Both solutions usually intensify the danger and make the situation even worse. Following is an example of panic.

• The flight instructor took his student to an outlying grass field for his third landing practice. The student's first three landings were rough but passable. During the fourth landing, a swerve developed and the SNJ headed for the boonies. The student overcorrected and the nose swerved back in the opposite direction. The student again overcorrected and the swerve was progressively worsened. At this point, the student put in full opposite rudder and pulled the stick all the way back into his lap and froze. The instructor's statement was, "I took over just as the stick hit the rear stops. The stick felt like it was stuck in cement. I was plenty scared. I used every bit of muscle I had in forcing it forward and in neutralizing the rudder. I can remember seeing the student move forward in the cockpit as he slid across the parachute—still clutching the stick. I can't remember when he let go. . . . After recovery, I was so shook I could hardly talk." Damage to the aircraft consisted of a scraped wingtip and the rear control stick bent 2¼ inches off center.

Although the SNJ is no longer with us today, the incident points out a couple of lessons. They are just as valid today and tomorrow as they were then. First, both the student and the instructor panicked. The thing that made the difference between incident and accident was the training, experience, skill (and strength) of the instructor. He knew the correction

necessary, and—although in extreme fear himself—he was still able to put it in. The student could only sit paralyzed with fear—unable to react appropriately. Second, the fact that the student let go somewhere during the recovery illustrates that somewhere within the maneuver his attention was diverted from his fear and he again started a logical, organized pattern of thought.

The best solution to panic is to provide training, skill and knowledge to prevent its appearance in the first place. However, once panic is present, then a calm, commanding voice is an excellent attention-getter and confidence-builder which has helped to get many pilots out of serious scrapes in the past.

Responses during anger are almost identical to responses during panic. They differ mainly in that panic reflexes are of an escape nature, whereas anger reflexes are primarily attack responses. When angered the individual is interested primarily in attacking whatever made him mad. If that is impossible then he takes it out on something else—sometimes the airplane. Here are some examples:

• A marine 1st Lt. was ordered to land his helo on the athletic field at Camp X. His mission was to pick up two senior officers and transport them to the training airfield. Enroute to the pickup area, the pilot discovered that he didn't have enough mae wests and crash helmets for the passengers. The pilot was extremely conscientious so he returned to the field and picked up the additional equipment—at the expense of considerable delay. Upon his arrival at the athletic field, he landed and the passengers were loaded. One passenger, a major, refused to wear the crash helmet even when requested to do so twice by the pilot. Rank being what it is in the eyes of an inexperienced junior officer, the pilot was quite irritated by this but couldn't do anything about it. When he lifted, the helo was yanked into the air and a left downwind turn was made immediately on takeoff. The helicopter crashed due to overcontrolling and lack of attention to rotor RPM.

• After a two-and-one-half hour delay due to weather, the A-1 pilot filed his flight plan. He was informed that the weather might again deteriorate below minimums and to standby for possible cancellation. In the warmup area next to the duty runway, the aircraft experienced radio difficulty. Good judgment prevailed so the pilot decided to return to the line and see if he could get a quick fix on the radio. The pilot thought that if he was fast enough he could still get out before the weather brief void time.

Upon arrival back at the line, the pilot was quite upset to find no lineman waiting. After gunning the engine several times, to attract attention, he decided to taxi the aircraft between rows of parked A-1s. In his haste, his wingtip collided with another A-1.

• A *Skyhawk* was enroute home from a long cross-country flight. A normal left break was made but due to another aircraft on a GCA final, the pilot had to waveoff. A second pass resulted in another waveoff for the same reason. The pilot left the pattern transmitting, "I am waving off, call me when they are through." He was cleared for another break almost immediately.

Upon reentering the traffic pattern, the highly irri-

tated pilot broke close to the landing end of the runway at an extremely high speed, creating for himself an abnormal, and poor landing pattern. In the process of trying to salvage a high fast pattern, the pilot inadvertently retracted the throttle around the horn. The *Skyhawk* flamed out and crashed.

From the examples one can see that anger, even in one of its mildest forms—irritation, can distract attention and make precise movements impossible. It puts us in a frame of mind where we accept from ourselves reduced standards of performance in order to justify risks or shortcuts. Control of anger is again a matter of training, experience and above all —self control.

Judgment

Poor judgment, the fourth area, is a favorite catch-all phrase in many of the pilot error accident reports. Usually it's because there is often evidence of what a pilot did or did not do *after* the smoke cleared away. Whether anyone could have done any better, had they found themselves in the same situation, often remains to be seen.

Nevertheless, judgment in the cockpit is sometimes critical and difficult. Quite often, accurate judgment is impaired by limited time, limited information, limited alternatives or a complicated set of interdependent alternatives.

The pilot evaluates without even realizing it. Once the situation is evaluated, he will select the choice of action he feels will best suit the situation. Usually, this takes only a split second. Training, experience, degree of problem anticipation and preplanned solutions all reduce the likelihood of mishaps due to poor judgment.

Volumes and volumes of material have been written on the subject of judgment and decisions. In essence, just about every authority has his own concept as to what specific corrections must be made to make judgment more accurate. In short, considerable disagreement yet exists in the field.

There does, however, appear to be a factor that shows up often in pilot error accidents which *caused* poor judgment—Ego.

Ego is sort of a picture of one's self projected and admired in our own mind. Its face is one's own face as seen by ourselves—not as others see us. It has a voice—a loud one too. So loud that all our judgment is profoundly influenced by the advice and consent of this ego. The ego is sometimes very tender to outside criticism and reacts to polish the image or repair a torn or damaged picture. Quite often this leads to the price carried on the pilot error label. Ego does not seem to dominate any particular rank, age group or experience level.

"Should I dust-off the old hometown just to let folks know I'm around?" Whether or not you go by the hometown, and at what altitude, is a matter of judgment that is influenced by the old ego. Still not convinced? How about when you find yourself at minimums during a GCA and still not in visual contact. Haven't you heard that voice say, "go ahead and take it down another 50 feet—your altimeter is indicating 50 feet low anyhow." It's sort of like a Las Vegas bet except the odds of walking away a winner aren't as good. Let's look at a couple of examples in which ego influenced judgment:

• A lieutenant was an extremely conscientious pilot in a multi-engine patrol squadron. Since he had worked hard and had considerable talent, he was designated a plane commander in about three months. Although a qualified plane commander, he still continued to fly as copilot due to his lack of flight hours.

On the morning the airplane was being deployed overseas, the actual plane commander was admitted to the hospital for emergency surgery. Since the squadron was quite short of designated plane commanders for deployment, it was decided that the lieutenant would be sent as the plane commander and the copilot would be a very experienced junior officer. As the day wore on, the lieutenant appeared to become more and more apprehensive of the deployment. The aircraft finally departed for the overseas base at approximately 1600. This was the pilot's second flight as a PPC. He had a total of only 98 hours first pilot in the aircraft.

Arriving over the overseas base at about 2300 the pilot was informed that the weather was 200 feet and a quarter-mile visibility with fog.

The first GCA was commenced without informing the crew of his intentions or without directing the crew to take ditching stations. On the first approach, he waved off at GCA's command when he got too far below the glide path on final. During the wave-off he was advised to proceed to his alternate; however, he wanted to try one more approach. On the second approach the aircraft flew into the water approximately 1100 feet short of the end of the runway. Half of the crew received fatal injuries.

Although several other factors are evident in the accident, the investigation indicated that ego had some influence on judgment.

The pilot was apprehensive due to a lack of experience and self-confidence. On one hand he wished to

be first in command as the plane commander. On the other hand, he knew that he had neither the experience nor the confidence for it. His choice of action illustrates that ego shouted loudly, "go ahead —maybe *we* can get away with it!"

• A very experienced senior A-3 pilot was extremely conscientious and took exceptional pride in both his flying ability and his squadron. Following a fire power demonstration he was congratulated in the wardroom for his fine demonstration of low angle loft bombing. As an afterthought, the admirer added that it was the first time he had ever seen an A-3 inverted. The pilot answered, "We aren't supposed to put them on their back; however, I do it now and then to show people that it can be done."

The next fire power demonstration was about a week later. The sky was clear of clouds although haze was quite thick. As usual, the flight deck was crowded with spectators—many of whom were again looking forward to the A-3 loft event with expectations of seeing a heavy multi-engined bomber maneuvered like a fighter. The A-3 went by right on schedule, lofted its weapon, and continued its rolling turn to the inverted position. This time the aircraft hesitated—remaining inverted an unusually long time. As the aircraft descended the recovery roll was agonizingly slow—too slow. The aircraft hit the water and disintegrated.

The AAR board ruled that the accident was pilot error due to disorientation at the top of the loop. They had good solid evidence to support it too. In view of the past fire power demonstrations and the conversation overheard in the wardroom, what do you think? I believe that ego was riding along saying, "make the squadron look sharp, set a real example for the juniors to follow."

There's an old cliche which says, "rules are made to be broken." I suspect that ego conned the pilot into believing rules and aircraft limitations are synonymous.

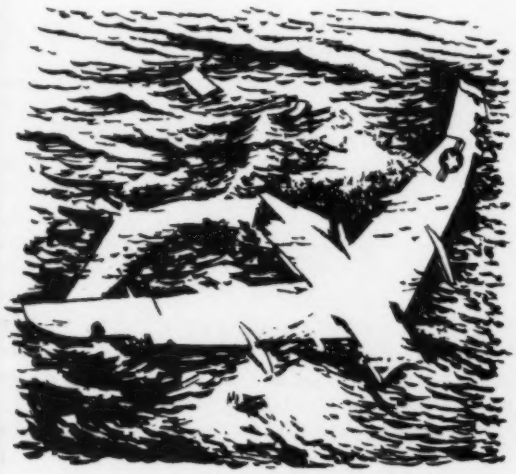
• Another pilot was involved in a competitive exercise in low-level bombing. He had a past record of doing rather poorly and had discussed his poor performance with others on several occasions. He had stated on the day of the accident that he was determined to get an "E" no matter what the cost. The A-4 exploded and disintegrated when he flew into the wooden target pyramid trying to get it. Although target fixation is believed to have actually caused the accident, ego certainly set the stage for it.

So What?

Aviation safety and combat readiness are the primary responsibilities of command. Statistics bear out the fact that accident rates have been steadily declining ever since 1953. Recent events indicate that the Navy combat readiness is such that we are able to deliver the goods anywhere in the world on extremely short notice. Command has met its responsibilities well.

The prevention of pilot error accidents is primarily an intimate personal responsibility of the individual. Listed are what I feel are the four most important underlying factors of pilot error. They are by no means the only factors—I have barely scratched the surface. Since it is you, the pilot, who has absolute command of the aircraft you fly, then it is you that must recognize your own problems of attention, interpret your surroundings as they really are, control your emotions, and keep the ego in the proper perspective.

The incidents that I used are actual. Perhaps these will also be filed in the back of your mental locker of prized possessions labeled: "Experiences learned from others."



Luck rarely prevents an accident: Professionalism often does.

HONOR ROLL

For Distinguished Safety Achievement Fiscal 1964

Last month's APPROACH published the annual CNO Aviation Safety Award winners. Following is a list, submitted by type commanders, taking special notice of those commands that operated debit-free* the entire year.

CNARESTRA

VA-731	VP-662	VP-779	VP-891	VR-721	VR-834	VS-722	VS-863	HS-772
VA-732	VP-671	VP-791	VP-892	VR-722	VR-861	VS-724	VS-864	HS-811
VA-773	VP-672	VP-792	VP-893	VR-723	VR-862	VS-733	VS-872	HS-812
VA-811	VP-674	VP-793	VP-911	VR-724	VR-871	VS-734	VS-873	HS-821
VA-831	VP-701	VP-812	VP-912	VR-731	VR-872	VS-735	VS-874	HS-822
VA-832	VP-702	VP-813	VP-914	VR-732	VR-873	VS-736	VS-891	HS-831
VA-861	VP-703	VP-814	VP-915	VR-733	VR-874	VS-741	VS-892	HS-832
VA-873	VP-704	VP-815	VP-933	VR-734	VR-881	VS-742	VS-914	HS-871
VA-879	VP-721	VP-831	VP-934	VR-742	VR-882	VS-743	VS-932	HS-872
VA-822	VP-722	VP-833	VP-935	VR-743	VR-883	VS-751	VS-934	HS-891
VA-891	VP-723	VP-834	VP-936	VR-751	VR-893	VS-752	VS-935	HS-892
VA-892	VP-724	VP-836	VP-937	VR-771	VR-894	VS-753		HS-911
VA-912	VP-725	VP-837		VR-772	VR-911	VS-771		HS-912
	VP-726	VP-839		VR-773	VR-912	VS-773	HS-701	HS-931
	VP-741	VP-871	VR-661	VR-774	VR-913	VS-774	HS-702	HS-932
VF-661	VP-742	VP-872	VR-662	VR-792	VR-931	VS-776	HS-721	
VF-662	VP-771	VP-873	VR-671	VR-793	VR-932	VS-821	HS-722	
VF-673	VP-772	VP-874	VR-672	VR-812	VR-933	VS-822	HS-731	
VF-703	VP-773	VP-875	VR-673	VR-813	VR-934	VS-823	HS-733	
VF-791	VP-774	VP-876	VR-674	VR-821		VS-835	HS-734	
VF-792	VP-775	VP-877	VR-701	VR-822		VS-836	HS-742	
VF-822	VP-776	VP-878	VR-702	VR-831	VS-661	VS-837	HS-751	
VF-832	VP-777	VP-881	VR-703	VR-832	VS-662	VS-861	HS-752	
VF-881	VP-778	VP-882	VR-704	VR-833	VS-721	VS-862	HS-771	

CNATRA

VT- 4 VT- 6 VT-29

COMART

VMA-123	VMA-142	VMF-111	VMF-221	VMJ-4	VMR-222	HMM-765	HMM-768	HMM-771
VMA-134	VMA-233	VMF-113	VMF-351	VMO-4	VMR-353	HMM-766	HMM-769	HMM-776
VMA-141	VMA-241	VMF(AW)-215	VMF-543	VMR-216	HMM-764	HMM-767	HMM-770	HMM-777

*free of A and B damage aircraft accidents, A and B damage ground accidents, A, B, or C injury incidents and A, B, or C injury ground accidents (OpNavInst 3590.5F)

FMFLANT

HEDRON, FMFLANT H&MS-14 H&MS-26
VMT-1 VMCJ-2 H&MS-24 H&MS-31

VMFA-115 VMGR-252 VMA-331 HMM-264

COMNAVAIRPAC

VA- 52 VAH-2 VF-191 VP-40 VS-25 AEW BARON PAC
VA- 55 VAH-4 VP-42 VS-33
VA- 93 VP-47 VS-35
VA- 95 VP- 1 VP-48 VS-41 HS-4
VA-112 VAP-61 VP- 4
VA-113 VP- 6 VU-3
VA-126 VP- 9 VQ-1 VU-5
VA-127 VF- 51 VP-17
VA-157 VF- 96 VP-19 VW-1
VA-215 VF-111 VP-22 VS-21
VA-216 VF-142 VP-28 VS-23 VX-4

AIRFMPAC

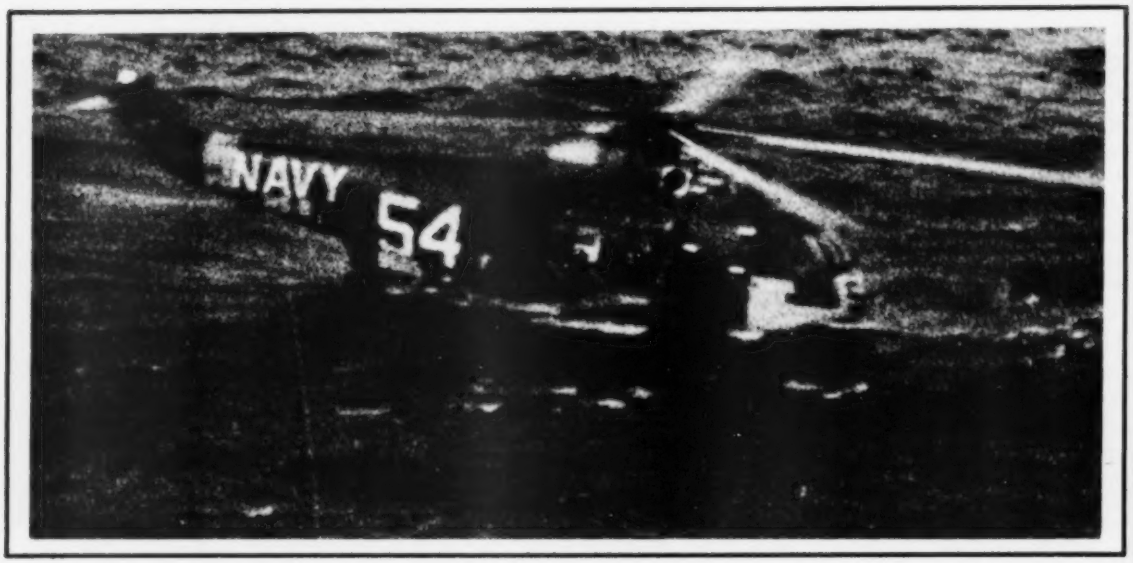
HEDRON, AIRFMFPAC

H&MS-11 MAMS-17 VMGF-152
H&MS-33 MAMS-37 VMGR-352
VMT-2 VMA-242 VMFA-542 HMM-362
VMF(AW)-122 HMM-363

COMNAVAIRLANT

AEWTU VP- 5 VR- 1 VS-39 HS-1
VP- 8 VR-24 HS-5
VP-10
VA-34 VP-11 VU-4
VA-42 VP-16 VRC-40 VU-8
VA-45 VP-18
VA-85 VP-21
VP-23 VS-22 VW- 4
VP-24 VS-26 VW-11
VAH-11 VP-26 VS-27
VP-44 VS-28
VP-49 VS-30 VX-1
VF-11 VP-56 VS-31
VF-14 VS-32
VF-31 VS-34 RVAH-5
VF-84 VQ-2 VS-36 RVAH-9

A single accident is one too many.



'Helo 54... Where are you?'

A professional performance by HS-8 provides a naval aviation first.

We were scheduled for a routine SH-3A night ASW dipping mission in the waters off the southwest coast of the Philippines. Preflight of our aircraft, Side Number 54, revealed no discrepancies and a normal takeoff was effected at 0145 as scheduled. Following liftoff we received a vector of 200 degrees magnetic, 28 miles to our assigned operating area.

Arriving on station at 0210, we were placed under the positive control of our assigned destroyer. Weather in the area was generally favorable, although we lacked any horizon due to the darkness, partly cloudy skies and only a sliver of moon. The wind was from the south at five knots with a sea state of "one."

Our controller from the tin can vectored us through eight consecutive sonar dips with no difficulty and with the aircraft functioning normally. Because of the high density altitude and corresponding high outside air temperature, plus the relatively calm winds, it was noted that approximately 75 percent torque was required to maintain a hover; this was not considered unusual.

The ninth dip at 0351 followed the pattern of the previous eight up to a point. After approximately six minutes of the dip cycle we were suddenly jolted by a loud explosion accompanied by a brilliant flash of fire from the no. 2 engine. An immediate and complete power loss in the affected engine resulted and though no. 1 engine instantly accepted the load, insufficient power was available to remain in the hover. The aircraft settled rapidly toward the water with a concurrent decay in rotor RPM despite partial lowering of the collective. Water contact was made in a normal hover attitude (slightly nose high) at which time the rotor RPM was observed to be at 75 percent. By bottoming the collective at this point, RPM was immediately regained and water stability established.

In the meantime, the number two engine was being secured by the copilot due to ZERO torque reading, excessively high power turbine inlet temperature (T_5), and a fire warning light. The latter problem disappeared upon shutdown . . . much to our relief.

After ascertaining that everything aft was secure and that our two crewmen were uninjured, the copilot commenced broadcasting our situation on HF radio (UHF capability had been lost due to the location of the antenna in the water beneath the hull of the aircraft). Some 20 minutes were consumed in searching for a usable frequency, but eventually communications were reestablished with the carrier's CIC on the raspberry circuit (the time delay here was also attributed partially to antenna location plus poor HF equipment performance).

The sound of voices "from the outside world" had a calming effect and we set about evaluating our situation. Because of the favorable water conditions and the reliable performance of our no. 1 engine, it was a virtual certainty that we would be able to remain afloat for some time. With daylight approximately one-hour-and-a-half away, and with a destroyer on the scene, plus aircraft orbiting overhead, we felt comfortable while waiting for the carrier to close our position.

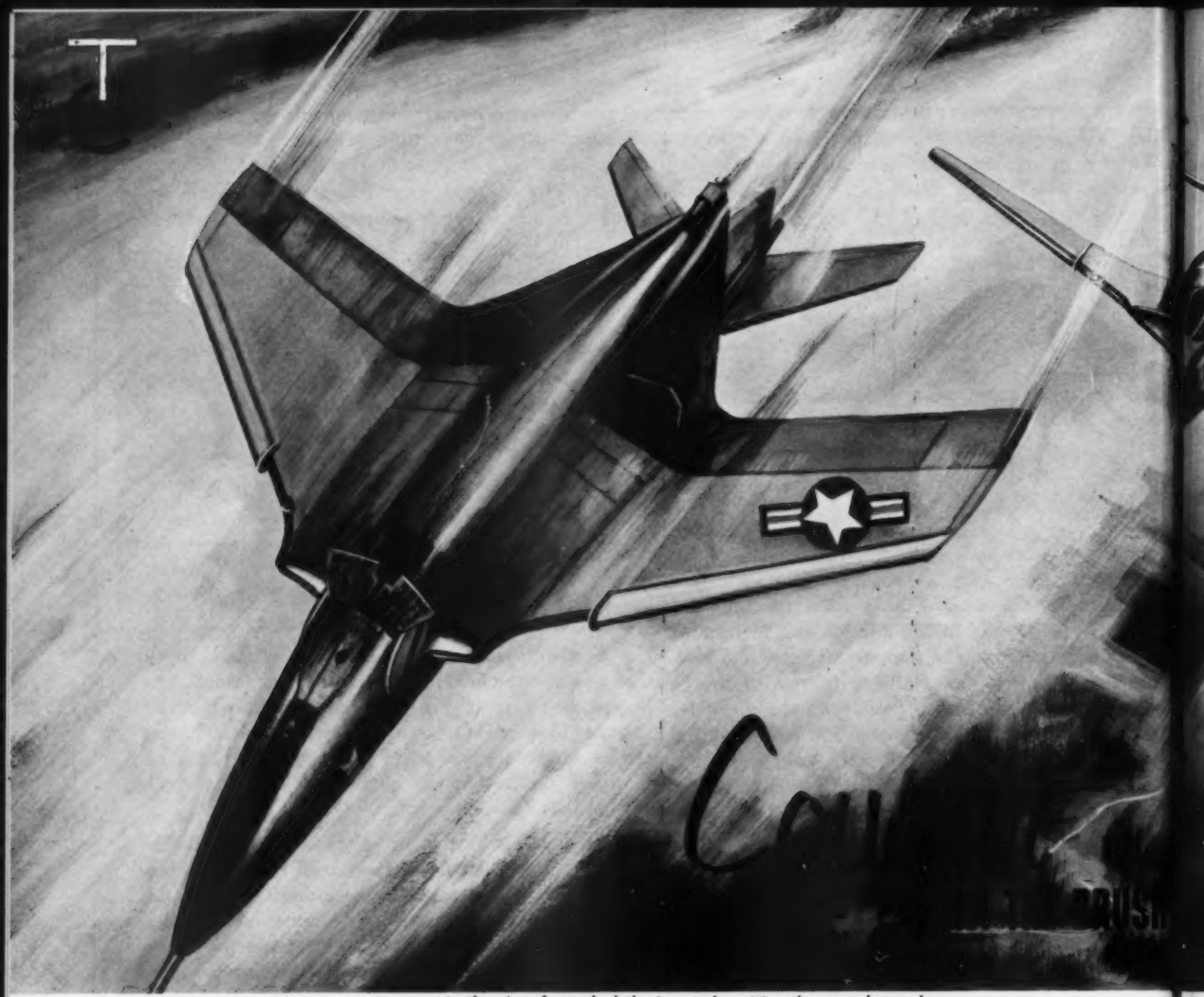
The decision was made to jettison all possible gear not considered essential to flight, and, after daylight, to put the two crewmen over the side in the Mk-4 life raft for pickup by the destroyer whaleboat. Meanwhile an additional weight reduction would be gained by the fuel consumption from our good engine. The no. 1 engine temperature and RPM limits were manually increased beyond normal from within the cabin to give the maximum possible power for takeoff.

Aircraft performance on the water was outstanding. NATOPS procedures were employed and proved to be the best for taxiing; that is, keeping the aircraft headed 30 to 60 degrees port of the swells which, in this case, were two to three feet high.

At about 0530 sufficient light was available to allow us to make final preparations for our takeoff. The crewmen were put in the water and the aircraft yawed to the right to keep them clear of the tail rotor. The raft was inflated when they were well clear and within minutes they were picked up by the destroyer's whaleboat.

At about 0555 the aircraft was turned into the wind and we commenced the takeoff run. Power was gradually applied to make the aircraft light on the water and the nose was eased over to a level attitude to gain forward movement. Some restriction to forward movement was experienced during the takeoff run, though no more than anticipated. After a run of perhaps 150 yards, translational lift was attained and maximum power of 115 percent torque was pulled in at the crest of one of the swells. The aircraft lifted off immediately and the nose was rotated to pick up speed. Despite the use of pitot heat, salt water spray had made the pitot static instruments inoperative. Airspeed was requested from an accompanying aircraft and we were advised that our airspeed was 90 knots. We climbed to 500 feet to permit autorotation into the wind if necessary.

UHF communications were regained while enroute to the carrier, recovery information was obtained and a normal single-engine approach and run-on landing was effected. The aircraft was shut down with the blades still spread and the pilots departed for a well-earned cup of coffee. . . .



As the aircraft reached the inverted position the nose dropped.

Murph was looking forward with high expectations to the day that he would wear the mark of the profession—a genuine set of Navy wings. All he had left to go in the program was a few FMLPs and to Carqual in the *Cougar*.

"Yep," he thought, "I've really got it made. Here I am with 250 hours and nothing but fine write-ups in the FMLP jacket. Old paddles had better watch out today—I'm red hot!"

During the hasty preflight, the plane captain secured the rear cockpit since this would be a solo flight. Without double-checking rear seat security, Murph jumped into the TF-9J and lit off. Line checks were normal except the low fuel boost pressure failed to check out. Normally, this would be a downing discrepancy; however, Murph decided to substitute his own judgment for doctrine and take the aircraft anyway.

After takeoff, Murph proceeded directly to the established fuel burn-down area. He arrived at 1500 ft. altitude and commenced burning down at 96-97%, 260 kts with dive brakes OPEN. On one leg of the burndown pattern, Murph sighted another *Cougar* from his flight and decided to join. As he closed the relative distance, Murph started to rapidly overrun so he crossed behind the lead aircraft—from left to right about 300 feet astern of the other aircraft.

When Murph finally slowed down to the other aircraft's speed, he found himself in a 2 o'clock

position from the other aircraft. Murph was somewhat embarrassed and irritated by the lack of preciseness in his join-up. He therefore decided to bolster his injured ego by executing a flaperon roll and at the same time, show his audience of one that he was potential Blue Angel material.

The *Cougar's* roll to the left was at a moderate rate. As the aircraft reached the inverted the nose dropped through the horizon and the aircraft started descending towards the ground. Realizing that he was inverted at less than 1000 ft., Murph panicked. He simultaneously added full power, closed the speed brakes, put in full forward stick and increased the roll rate to the maximum. When the wings were level, he pulled the stick all the way back to the stops.

The pilot of the other aircraft described the recovery as follows:

"In order to regain sight of the *Cougar,* I rolled into a 20-30 degree right bank. I saw him so close to the deck that the jet wash was making a wake in the sagebrush. His wings were rocking and the aircraft appeared to be extremely unstable and in a stalled condition. The next thing I saw was the pilot eject from the aircraft."

Murph thought that the aircraft had ricocheted off the ground. He believed the aircraft was severely damaged and shedding parts so he ejected at an estimated 50 ft. altitude. Ejection was successful and only minor injuries were inflicted during the landing.

The accident board agreed that the cause of the accident was primarily the overconfident, impulsive attitude of the pilot. The events in the air were merely a culmination of errors in which the pilot allowed the aircraft to enter into a maneuver from which recovery was beyond his capabilities.

It cannot be overly emphasized that an incipient attitude of overconfidence, once established in a person, is sometimes extremely difficult to dispel. The cycle of overconfidence, haste, ill-channeled eagerness, and thoughtless violation of standard operating procedures is a vicious one and may easily become repetitious. All naval aviators must be made aware of the proposition that the highest goals in naval aviation safety are achieved by perseverance, a continuing professional aptitude and attitude, and by adherence to the dictum that we must profit by the experiences of others.

A common misconception prevalent in naval aviators, though psychologically sound, is that, "It can't happen to me." It might be apropos to substitute the maxim that, "I hope it doesn't happen to me, but if it does, I will be as well prepared as possible." It is pertinent at this point to mention that Murph's first words to the flight surgeon when the latter initially reached him at the scene of the accident were, "Thank God for the training they give us!"

"I hope it doesn't happen to me, but if it does, I will be as well prepared as possible."

Bugsmasher

By LT T. L. Binns
CAPT H. L. Snider, USMC
VT-6

This article has been written for an obscure group, the FOAMADS (Fraternity of Antique Military Aircraft Drivers). They are unique in their utilization of one particular aircraft, known variously and fondly (or not so) as:

The SNB or *Sneeb, Sweet Nellie Brown;* The TC-45; The *Bugsmasher,* and a few others unfit for print. The members of this austere group often pass unnoticed among their fellow men and would remain so but for the following idiosyncracies:

(1) Shaving kits stuffed with "Preparation H"
(2) E6Bs rusted securely at the 135-knot point on the dial
(3) Tumbling eyeballs, permanently uncaged by numerous hard landings
(4) Utterings of "Any landing you can walk away from is a good landing"—a phrase which no doubt owes its origin to this same group.

The article is seriously intended for the perusal of all those currently flying the skies in the world's oldest executive transport, the TC-45. Time and space will not allow a wide discussion of techniques. We have concerned ourselves only with the takeoff and landing phases, and a brief discussion of fuel management. Only the normal landing, under normal landing conditions, is covered. Multi-engine pilots will note the absence of any discussion on the use of differential power. Under normal conditions (without extreme crosswind), if a takeoff or landing is properly planned and flown, no need should arise for the use of differential power. So without further ado let's adjust our goggles, remove the ejection seat pins, and taxi onto the duty.

Revisited

The Takeoff

The aircraft should be lined up to take advantage of runway centerline for swerve control purposes whenever possible. A reference point at the upwind end of the runway can be utilized to maintain directional control. Addition of takeoff power will result in a slight swerve to the left. Anticipate this swerve with a small amount of right rudder and/or brake pressure.

At approximately 35 knots, the tail should be allowed to come off the deck and a flat attitude should be maintained to allow the airspeed to increase as rapidly as possible. Liftoff should occur at about 65 knots.* After liftoff, normal climbout considerations apply.

The Normal Approach

A normal approach begins downwind with the runway visible ¼ of the distance inboard from the wingtip, gear down, 15 degrees of flap, and 95 knots. Approaching the 180-degree position power is reduced to 14″-17″, flaps lowered to 30 degrees, and a 25-30 degree banked descending turn initiated, utilizing 85 knots. A straightaway between 800-1000 feet should result. The aircraft is slowed to 80 knots in the straightaway and aligned with runway centerline directly ahead of the pilot. By selecting a specific landing line, as opposed to just planning to land on the runway, the pilot provides himself

*Although the TC-45J Flight Manual recommends 80 knots as single engine minimum control airspeed, flight experience has proven that 65 knots is a more realistic Vmc.

with a drift correction reference line while airborne and a swerve control reference line after touchdown. When assured of making the runway, power is reduced to a maximum of three inches above the idle stop to cushion the flare. The remaining power is reduced to idle during or after the flare.

The Flare

Over the fence the pilot's attention is shifted to a reference point midway down the runway. Staring straight down at the runway from the cockpit usually results in a high flare. Conversely, using a reference point at the upwind end results in a late flare followed by the inevitable bounce.

A smooth, gradual flare is initiated between 50-150 feet above the runway so as to arrive at a point *inches* above the runway in a *level* flight attitude. As airspeed dissipates the nose is raised slowly, to "hold the aircraft off the deck." To paraphrase, the pilot attains a level attitude above the runway and trades airspeed for altitude by slowly raising the nose until the airplane quits flying. One should attempt to run out of altitude and airspeed at the same time, whenever possible.

The most common problem associated with power-off landing is failure to assume *and hold* the slightly nose-high attitude until touchdown. Fleet and proficiency pilots accustomed to tricycle-geared aircraft have difficulty visualizing the landing attitude in a conventionally geared C-45. Too much back pressure in the flare (overrotation) will result in ballooning, after which the aircraft may be reflared *IF* sufficient airspeed remains. Especially dangerous is the high rate-of-descent approach at a slow airspeed, followed by overrotation at the flare which fully stalls the aircraft without decreasing the rate-of-sink. The type of landing that ensues has been known to blow tires, chip teeth, and shorten sitting height.

Too little back pressure will result in a nose-low (or flat) attitude which results in a landing on the forward side of the wheels. This is similar to "spiking," which occurs when the back pressure is released *during the flare* and the decreased angle of attack at the slow landing airspeed drops the aircraft onto the deck in a nose-low attitude. Prop clearance from the runway in a level attitude is only 11 inches. Any combination of nose-low attitude and hard touchdown can result in bent prop blades. The "Old Pros" will tell you spiking is the only way to hold this baby on the deck. They're right—it may stay on for a week —while the mechs change props and engines.

The Touchdown

At the exact instant of touchdown, back pressure is released by placing the yoke *slightly* forward of the neutral (in the cockpit) position. By retracing the many trim changes since decelerating to drop the gear, you'll see why. If the airplane is allowed to remain in the landing attitude (nose high) after touchdown it will become airborne, for two reasons:

(1) The CG is behind the wheels and will be forcing the nose up.

(2) Normal landings are made at airspeeds which permit flight.

It is not sufficient to hold that beautiful attitude with which you just squeaked on and gloat over it. You'll have a chance to demonstrate it again,—soon, because the old girl will get airborne again, just as sure as weekends are rainy at Whiting. On your second landing (same approach) remember to release back pressure, dump the excess lift, and nullify the CG back there that's working against you.

Bounce Control

When the aircraft has been landed hard at a low airspeed with power off (usually due to a high flare) a dynamic bounce will occur, but will dampen quickly, like a rubber ball. This type bounce is hard on the gear, but no difficulty arises in keeping the plane on the deck because it has long since quit flying. More serious in nature is the aerodynamic bounce, which usually occurs after a late flare. The aircraft is landed with some power remaining and a nose-low touchdown on the front side of the wheels propels it back into the air, to varying heights depending on the force of impact and subsequent yoke control. The first rule is to hold or assume the slightly nose-high

The attitude pictured above is sufficient to catch prop tips, provided the landing is hard enough to compress tires and oleos fully. A flatter attitude means safe props.

landing attitude. Allowing the nose to fall through will result in a second nose-low touchdown, more violent than the first, after which the bounce will become aggravated to the point of uncontrollability. It is possible to reflare the aircraft, starting at the top of the bounce and dumping the lift at touchdown as previously described. It is also possible to add power and wave off. If any doubt exists, the latter solution is preferable.

One small hint to instructors and check pilots seems in order: Occasionally, the short-armed, muscular (former fullback) proficiency pilot may find himself in a high flare, or at the top of a healthy bounce, and erroneously decide to push the nose over. He will do so with such vigor that his arms stiffen and elbows lock, pinning the yoke forward against the instrument panel. No amount of effort by the instructor can get the yoke back in time to save all four propellor tips. At this point we recommend a sharp blow across the gentleman's chest to discourage any further application of forward yoke pressure. While this measure may seem extreme, the individual will survive with no permanent aftereffects and the accident board remains free to conduct their primary duties.

Swerve Control

From touchdown to turnoff the pilot must concern himself *solely* with maintaining directional control of the aircraft. Let the copilot perform those post-landing functions such as flap-raising, switching to Ground Control frequency. . . . The tail may be lowered at or below 50 knots and as it comes down the aircraft will have a tendency to swerve into the wind. Anticipate this swerve and correct it with *light* rudder and/or brake pressure. Use the tailwheel to aid directional control and leave it locked until *sufficiently slowed*. Don't groundloop in an effort to make that first turn-off. A swerve usually develops when the pilot waits too long to apply a correction, puts in too much (rudder and/or brakes) correction, and leaves it in too long. An inch of swerve should be countered by an inch of correction to stop it, followed by a return to the centerline.

Fuel System Management

Some folks are blessed with fast hands: a good blackjack dealer, a professional pianist, or Matt Dillon on Saturday night. But the fastest yet is the one on the wobble pump when both fans unexpectedly quit. This is not an uncommon experience in the C-45. The fuel tank selector and the indicator gage are two separate devices. It is possible to have the indicator gage set on a full tank and the selector handle drawing fuel from a tank nearly empty. One method of preventing this unpleasant experience is a simple, verbal exchange between pilots, of either "Right Main, Right Main, ...tenths remaining," or "2, 2, ...tenths remaining." The copilot points to the tank selector handle, the indicator gage switch, and the gage itself as he calls out the tank and quantity, and the pilot verifies the copilot's selection. This procedure should ensure that an empty tank has not been selected and that a positive flow of fuel is obtained.

Conclusion

We point to our past record in Training Squadron SIX as the strongest selling point for our words of wisdom. Over the past 2½ years the students and instructors in VT-6 have made more than 100,000 landings without an accident. We've compiled an enviable safety record in a 25-year-old airplane using the same basic techniques described herein. No doubt we'll draw comments from those of you who disdain power-off landings in the C-45. However, we feel that once a pilot has mastered the technique of making power-off landings he will never again have difficulty landing the airplane, regardless of the circumstances. Smooth flying, brother FOAMADS.

Pardon my Reach

The flight began like so many others that sometimes develop into hairy rides. It was to be routine instrument check with the first pilot in the left seat of the old *Beechcraft*. Preflight planning, preflight inspection and turnup were normal in all respects. The pilot was to make the takeoff and clean up, then give the plane to me after turning to the departure heading. Departure control would give us radar vectors.

"Give me the usual backup," he said.

"Navy . . . rolling," I informed Departure Control, as takeoff power was applied. As the pilot released his grip on the throttles, I synchronized the manifold pressures at 37 inches and noted 2200 rpm on both engines.

After a comfortable liftoff at 80 knots, the pilot motioned for me to adjust the power and props to climb settings while he raised the gear. I eased the throttles back to 29 inches, but due to my locked shoulder harness could not reach the prop controls. While I wrestled with the harness lock, the pilot adjusted the prop controls.

"What the #(*@?—feather number two!" brought me back to the instrument panel. There we were: 100 knots at 100 feet and feathering an engine. This seemed pretty drastic to me. With 1200 rpm on number two and heavy scrub trees and rough terrain ahead and below, I felt that our chances of making it with a windmilling fan would be nil. It's a long reach to the feathering buttons from the copilot's seat, but I made the trip in one lunge.

Care to guess what happened? Groping wildly across the cockpit for the feathering buttons, I inadvertently pressed the button for number one!

Somebody upstairs must love us, and they must have been watching (and laughing) because that is all that kept us out of the toolies. The feathering switch was in the off position and number one just kept on going strong. The pilot, a veritable chameleon by this time, turned a shade whiter, flipped the switch and feathered number two.

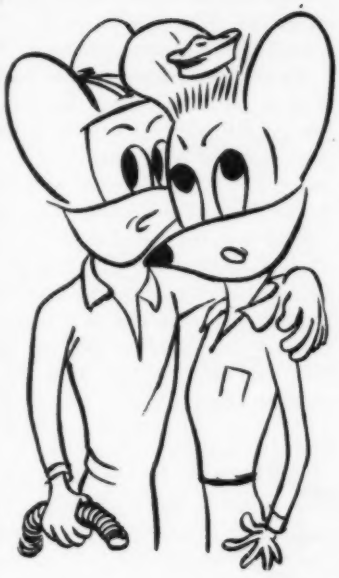
Don't let anyone tell you that old "Sweet Nellie Brown" won't make it around on one. At 2200 rpm and 35 inches (I know the book says 33 inches) with 85-degree runway temperature and 10 knots down the runway, 100 knots at 100 feet was "some sweat," but 'round we came to the other runway with a quartering downwind situation prevailing. The tower cleared the area and touchdown was sweeter than on two.

To top it all off, the situation didn't call for feathering in the first place. The propeller governor cable had been misrouted allowing the landing gear strut to contact it on retraction of the gear. The cable had been taped up out of the way, but the tape had come loose after the previous flight. When the landing gear was raised, the strut pulled the propeller pitch to full high on number two engine, resulting in the seemingly comical but rather tense situation.

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

—REPORT AN INCIDENT, PREVENT AN ACCIDENT—



When You Gotta Go . . .

I was taking a T-28B on a cross-country hop and had as a passenger a Navy dental officer unfamiliar with the aircraft. Prior to takeoff he was briefed on the rear seat controls, proper bailout procedures, and checked out in use of his radio in order to help tune VOR stations with the second receiver.

On the return trip the passenger informed me on the ICS that he wanted to relieve himself. I instructed him on the location and use of the relief tube.

He called me back and said that the tube looked exactly like the oxygen hose. Turning around in the seat to see for myself, I confirmed the suspicions.

"Yes, that is the oxygen hose," I said over the ICS, and turned back to the controls.

Upon arrival my passenger remarked that the relief tube certainly was difficult to handle. Some cross-examination revealed that he had used the oxygen hose in lieu of the evasive relief tube.

Redfaced, but a wiser pilot, I informed the plane captain about the contaminated oxygen hose system. In the future, my passengers can be certain of a thorough briefing on the cockpit they occupy. Of course with my luck he'll probably get the bailout bottle next time.

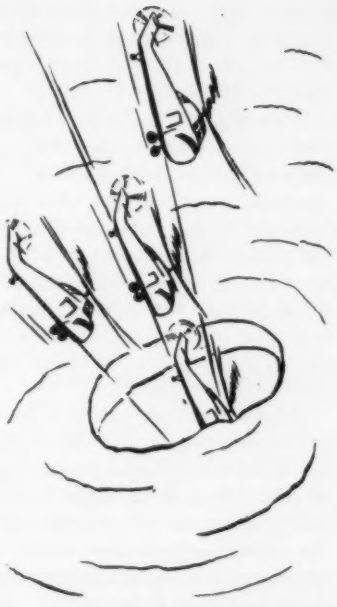
Match Case

Whiting Field—Here's an Anymouse report which may save someone a badly burned hand:

What: Plastic waterproof match case exploded as cap was being tightened. Explosion caused injury to pilot's hand.

Why: This case, made overseas, contained numerous safety matches in addition to a strip of abrasive to be used for striking matches. The twisting action of tightening the cap apparently rubbed the abrasive against the matches. The resulting fire inside the case generated sufficient pressure to shatter the plastic cap.

How to Prevent: Wrap striking abrasive in masking tape, foil or other suitable protective covering to prevent matches and abrasive from making contact.



Headwork Holiday

The cruise was over and we were going home. Our flight of SH-34Gs was delayed for several hours due to inclement weather. When we finally got off we knew very little about weather enroute or at the home base; we did know that it was VFR for helos and that we were going home.

Our flight leader took one fast orbit of the carrier and streaked for home before the flight could form up.

After catching up, the flight ran into a scattered layer of clouds around 500 feet. Our section decided to go over the top. The second section, unable to catch up, decided to go under the weather. Our section continued to climb, 1500 feet, 2000 feet, 2500 feet, and ended up on-top at 3500 feet.

Things remained fairly normal until the letdown. We made one transmission to the home field to check the weather—a sneaky way to get a quick DF steer.

Nearing home field, we were in a loose right echelon formation. I noticed a few breaks in the clouds and caught a glimpse of a high density airfield below.

Then it happened! Our section leader spied a hole in the weather and with no warning or radio transmissions to anyone, dumped his nose, turned into the echelon and down he went. The next few seconds saw five helos scramble down through the soup. Everyone lost sight of everyone else and it was a blessing that we broke out with nary a crunch.

What of the other section? They had elected to go under the weather. Were we letting down on top of them? I guess the flight leader didn't think of that. Fortunately the other section was about a quarter of a mile behind us as we broke out at 300 feet about half a mile from the upwind end of the duty runway.

There were so many mistakes made during this flight that they defy listing, but the two choice boners were: poor headwork and inadequate briefing.

Going up over the weather showed poor judgment, but the wild letdown was inexcusable. If we had proceeded further down the coast we probably would have found more favorable conditions for a normal letdown. And anyone knows that turning into the echelon of helos without first warning the flight is a cardinal sin.

Swinging Free

We were having our annual check-out in the helicopter pickup phase of water survival. Normal pickup procedure was for the helo to hover 10 to 15 feet above the water, lower the sling and hoist the man aboard.

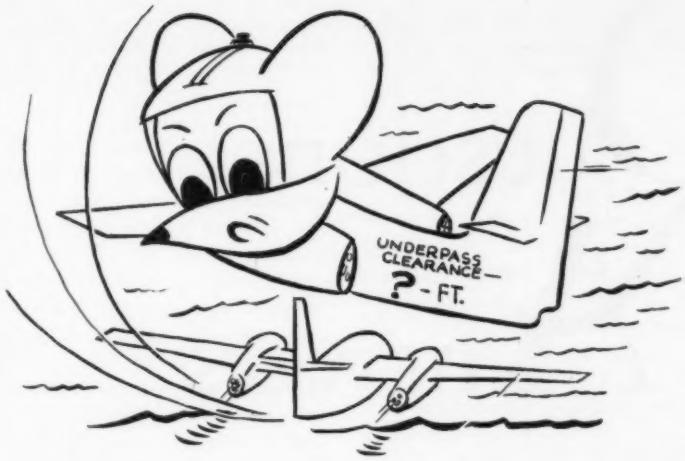
My simulated saviour had a relatively new aircrewman in a training status operating the winch in the aft station.

Shortly after I got into the sling, the pilot was given an erroneous and nonstandard voice signal by the aircrewman. The pilot thought I was aboard the chopper. He then commenced his usual pattern around the bay with me dangling below, still being hauled in by the winch.

Five or six feet short of the copter the winch gave a few sporadic jerks and ground to a halt. We had climbed to 300 or 400 feet and were passing over a strip of land. My emotions were slightly mixed as I watched telephone poles slash by underneath me.

About three quarters of the way through the tour around the bay the pilot finally got the straight dope and the helo started to descend. I was hoisted the rest of the way up and welcomed aboard.

Back over the water about 10 to 15 feet above the surface, I got the word that my thrilling tour of the bay was over and to jump. I certainly was glad to get out of that helo and secure from this training phase.



Midair Almost

It was one of those nights—visibility about 3 miles with haze and fog, cloud cover was scattered at 400 feet and 600 feet with an overcast at 900 feet, and it was plenty black. To top it all off, we had a midnight launch.

An S-2D from one of our sister squadrons had commenced localization on a disappearing radar contact and we were called in to assist.

Approaching datum, we indicated 300 feet on the radar altimeter and our playmate was spotted up ahead. I told him I was at 300 feet and he rogered and said he was at 500. He mentioned that we both looked like we were at the same altitude. Weather was really getting sour.

As we closed, my playmate told me again that he was at 500 feet and that I appeared at the same altitude if not higher. To ease the situation, I dropped to 200 feet and continued closing, feeling confident of sufficient altitude separation.

Still closing, I saw the other plane turn rapidly and dive under me. I saw his green wing light as he passed in a 30-degree plus bank and descending. I also felt the buffet from his slipstream.

"Did he go in?" I yelled at my copilot (I'd have bet a month's pay that he did).

I got on the UHF and called him; he acknowledged the call and said that he was okay but wasn't sure at what altitude he had recovered. It sure was close.

Moral: Fly your assigned altitude, believe your instruments (including the radar altimeter) and do not rely on your senses when operating in and out of the soup at night.

Heads Up!

The *Orion* was climbing to 21,000 on an IFR departure in CAVU weather conditions. Climb instructions were to intercept the 090-degree radial of NAS Testville omni, climb on course to Mudville and proceed via flight plan route.

While climbing through 18,500 on a heading of 090, a lookout reported an aircraft at nine o'clock, high and closing. It was a C-135 southeast bound cruising at 19,000. Our projected flight paths would have merged over Mudville. Center did not pass any target information for our vicinity and our climb instructions from Testville departure control called for climb on course.

Investigation revealed that the C-135 was from a nearby field on a VFR training flight.

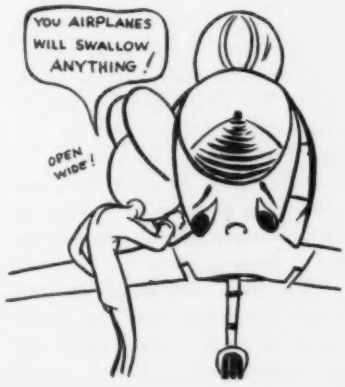
This near-miss once again backs up the argument for a heads-up, eyeball-swiveling type operation during VFR flight conditions regardless of the type departure or clearance.

Wonder Where the Yellow Went?

EVERYTHING seemed okay when the plane captain completed his preflight of the F-3B. Shortly thereafter, a yellow motorized vacuum sweeper came through the line area, scooping up potential cause factors. After the sweeper had gone, the plane captain decided to take a last look at his bird.

Lo and behold! A yellow 5/8-inch nut was found in the F-3's starboard intake. Seems that even the FOD prevention sweepers themselves can spread FOD.

Congrats to the plane captain for preventing another dent in the AirLant budget.—Ed.



Reader Questions Headmouse Answers

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk, Virginia 23511. He'll do his best to get you and other readers the answer.

Pop-Top Oil Cans?

Dear Headmouse:

Jet engine oil contamination has been a problem in the Navy for years and for a great many reasons. One of them is contamination resulting from opening of the can. I've seen oil cans opened with everything from a fire axe to a chisel.

A good way to prevent such contamination would be to procure oil in cans with pop-top openers similar to beer and cola cans. Keeping the tabs from becoming a source of FOD might become a problem. What do you think?

CHARLES T. DENISON
Q.C., NAS DALLAS

▶ The FOD threat is genuine but we may also run into problems with the SFTPOEOHBTPTBCT (Society for the Prevention of Engulfment of Humanity by the Pull-Top Beer Can Tab). They state: "We would like for you to consider the problem we, as human beings, are faced with: By the year 2000, America will find itself in a position of having to wade through pull-top can tabs to get to work or play.

"We feel that humanity can handle the empty beer can itself, which is easily seen, picked up, put into a trash can and hauled to the dump. But the pull-top tab is a different matter. If you do not believe it try picking one up from the ground.

"To show the magnitude of the situation, here is some inside information.

"Most persons think the 1960 'Steel Crisis' which shook Wall Street was caused by harsh words between steel magnates and the late President Kennedy.

"This was not so!

"It was caused by the inside rumor that the 'church key' was soon to be replaced. Tons of steel each year go into the production of this item and insiders realized the threat to steel production.

"But this is not what this Society is worried about. We are concerned with our grandchildren going out in the yard to play only to find there is no grass, just an upper layer of pull-top tabs. True this will eliminate the cutting of grass, but remember that between now and 'saturation time' the rotary grass mower will be spewing out cut grass and pull-top tabs in equal ratio. This we do not want!

"Anything you Safety Center people can do to assist us with our campaign will be appreciated."

You know, those people might be right in their fight. Just think of the consequences if jets got into the act.

Very resp'y,

Headmouse

P.S. Seriously your idea is being forwarded, nevertheless, to the appropriate procurement people for consideration.

SP-2H ECM Antenna Stowage

Dear Headmouse:

Flight crewmembers in this squadron all agree that the location of the ECM antenna stowage bracket in the SP-2H aircraft is unsatisfactory. Numerous ordnancemen and observers have suffered face and head lacerations while manning the afterstation observer's position. Exposure to this hazard is especially critical during ASW opera-

tions when time is of the essence.

We recommend the subject stowage bracket be relocated in a position aft of the observer's seat.

JOHN T. MCDANIEL, AO1
VP-17, FPO SAN FRANCISCO

▶ Agree that the present location of the bracket is an injury hazard and should be relocated. However, a similar location behind the observer would create a missile hazard on ditching. Also, this would interfere with his headrest while sleeping. This is a puzzler and we feel sure that some operators have, or may come up with a satisfactory solution. If you think you've got the answer to this one, please let us know.

Very resp'y,

Headmouse

Safety Award Criteria

Dear Headmouse:

I've heard that the procedures for selecting the annual CNO Aviation Safety Award winners have been changed for fiscal year 1965. (*Winners announced in Weekly Summary 27 July—2 August 1964 and on the inside back cover of the October 1964 issue—Ed.*)

Is this true? If so, what are some of the changes?

CURIOUS MOUSE

▶ Most significant of the numerous changes made are:

1. Competition will be limited to squadrons within a major command.

2. The number of awards has been reduced to 24.

3. Statistical performance will not be the only selection criterion.

4. More emphasis will be placed on "contributions" to aviation safety (see below)

5. A single CNO Readiness Trophy will be awarded (on an annual rotating basis) to the most outstanding of the 24 award winners.

Of particular interest are the new selection criteria. OpNav Instr 3590.5G of 27 May 1964 states in part:

Selection Criteria. Selection of winners shall be made by major commands based on the broad criteria of safety contributions as well as outstanding safety records.

Safety contributions may take many forms; however, selection criteria will include but not be limited to the information submitted in enclosure (1)* and the items listed below:

a. Quality of investigation and reporting of aircraft mishaps.

b. Safety program improvement over preceding year.

c. Contributions to aviation safety:

(1) *Effective and expeditious use of malfunction reporting system.* (Italics supplied by Ed.)

(2) Accident prevention ideas submitted (other than AARs).

d. Recommendations for improvement or change to:

(1) Personal survival equipment.

(2) Aircraft equipment or hardware.

(3) Ground support equipment.

(4) Facilities

e. *Published safety articles.* (Italics supplied by Ed.)

f. Missions accomplished in addition to those normally assigned.

Originators are responsible for notifying type commanders whenever safety articles are published or accepted for publication. Articles accepted for publication in APPROACH usually appear in the magazine about three months later. So if you want an article to appear in a certain issue, be sure to send it in about 90 days prior.

Very resp'y,

Headmouse

*CNO Award Fact Sheet

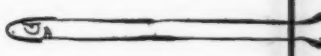
"I wasn't low, its just that the clothes lines were so high."

Terms to a

THRUST
In need of liquid nourishment.

LIFT
What you should give a serviceman.

LAUNCH
The noon meal.



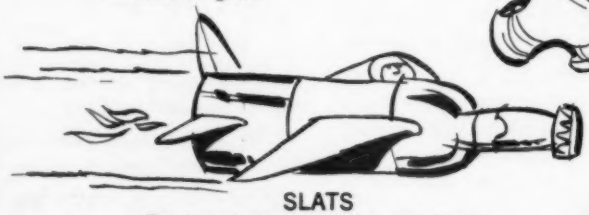
Actually pilot tube, but rected by printers.

VORTEX
A VHF omni-range station in Texas.

OMNI
A kind of grits.

TORQUE
What women do on the telephone.

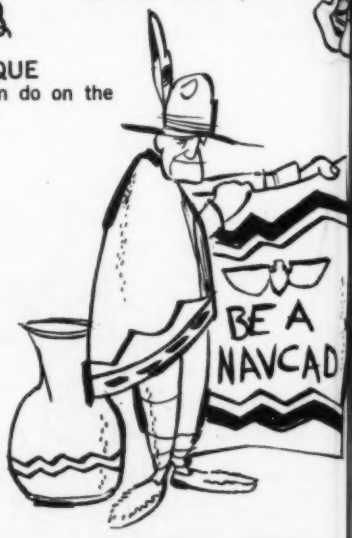
BANK
The guy who spins the roulette wheel and rakes in the chips.



SLATS
The beer that made Milwaukee famous.

SWEPT WING
Necessary in hangars inhabited by birds.

TACTICS
What a clock sounds like when it needs fixing.

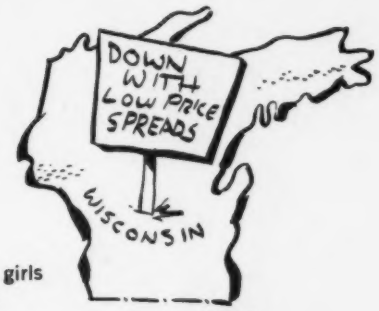


EXTERNAL STORES
Indian selling blankets along the highway.

aviate by...

PREFLIGHT CHECK
Advance pay in case you have to RON.

DATUM
What you do with girls before you marryum.

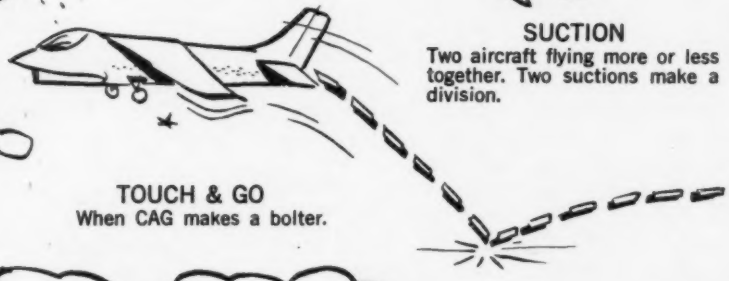


OLEO
A butter substitute much in disfavor in Wisconsin.

TOT TUBE
be, but misspelled by writers and cor-
s.

ROLLOUT
First word in a song about a barrel.

SUCTION
Two aircraft flying more or less together. Two suctions make a division.



TOUCH & GO
When CAG makes a bolter.

LOAD FACTOR
Brother of Max Factor.

VISIBILITY
A figure which, when multiplied by .2 gives a rough approximation of the density of the cigar smoke in the aerology office.

HIGH POWER TURNUP
A turnip crossed with a horseradish.

RUDDER
Opposite of rudder not.

Eliminating the Wife Error

By Jackie Starmer

Every Navy wife knows that keeping her ever-lovin' happy and content is her primary duty in life, and . . . that any additional duties thrust upon her, such as birther of babies, pumper of bicycle tires and dispenser of meals, medicines and money, are strictly her own puddle of mud and fer gawd sakes don't splatter Hisself with family problems, particularly before he hits the blue. And if this were fact instead of wishful fancy, all flying safety officers could retire to Peru and raise wart hogs.

Since it has long been the contention of flying safety officers that preoccupation with family problems oftentimes causes upset aviators to bend or even bust their birds, which in turn causes everyone from the Commander to the guard at the gate to get in a royal snit, it is obvious that something has to be done to eliminate the chain reaction resulting in "pilot error," or if you prefer the more honest term, "wife error."

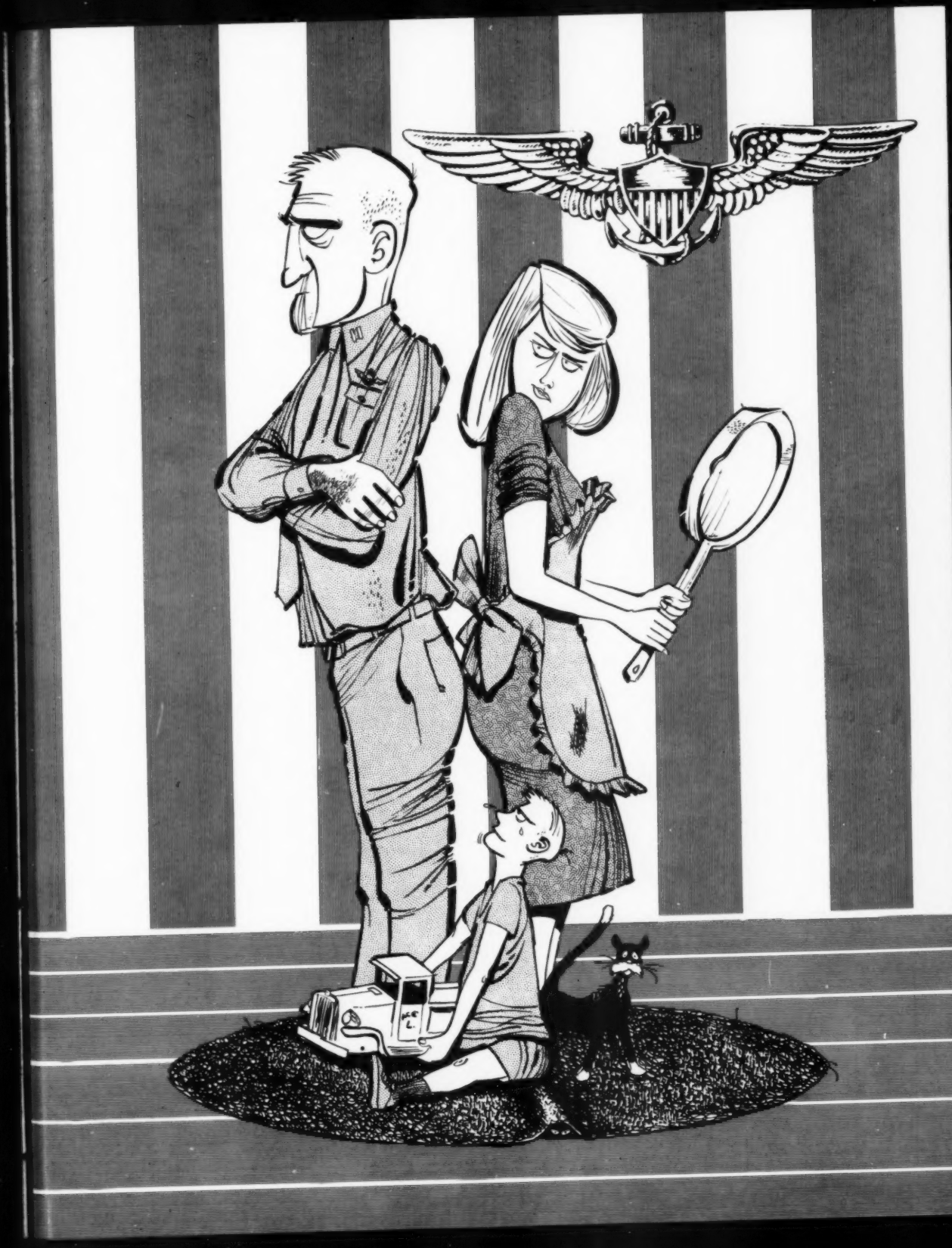
And since it is impractical to abolish existing Navy marriages, and wives will innocently or otherwise continue to muddle up Hisself's mental state before, after and during missions, it is suggested that a mandatory indoctrination course be held for wives of all flying personnel, briefing them on the hazards of hubby's home life, with particular stress placed on the importance of Twelve Hours Twixt Fight and Flight. Naturally, this course should be taught by a highly qualified instructor—someone with years of intimate knowledge and experience in creating these hazards . . . me, fr' instance.

Having been a veteran Navy bride for 17 years, I have been thoroughly orientated, indoctrinated, inoculated and regulated in all things military . . . I wear white gloves through receiving lines; I demand crew rest after birthings; I medicate my family with the standard Navy prescription of APCs and orange juice for every ailment from vertigo to obese ear lobes; I have never driven a Follow-Me jeep into a parked aircraft; and above all, I keep a calling card tray near the front door—where it seldom collects anything but cigaret butts, box lunch can openers and balls of rug fuzz. The important thing is, it's there.

It seems that in spite of this excellent Navy training and background, I find that as a perfect wife, I ain't much. I find this, thanks to the snide remarks of a flying safety bohunk whom I shall bite in the neck at the first opportunity. Now, I'm actually aware that Hisself should go beanless before a mission, but how was I to know that rutabagas are lethal? There's not one word in the flying safety manuals concerning rutabagas! It seems that rutabagas cause Hisself's gastric juices to over-gast something fierce; particularly when he's shooting landings; and the high cholesterol content riles up his fatty tissues to a fare-thee-well, also particularly when he's shooting landings and when these two evil forces collide in or around the old gump's pituitary, well . . . all hell breaks loose. And because of this slipshod oversight by safety manual writers, one airplane is AOCP for a year, the runway is undergoing extensive repairs, and a mangled S-2 tire now reposes in my living room as a plastic covered hassock.

Aside from being responsible for the home menu hazards, there's no doubt that we wives are held accountable for the daily problems of marital bliss that mayhaps miff an aviator to the point of being a potential wing-buster. Contrary to popular opinion, Hisself does not become a snarling beast only when his flaps won't flap, or his rudder won't rudd, or he wasn't promoted when he by-gawd shoulda' been . . . no, these routine problems don't put our "sky kings" into an accident-prone mental state.

Actually, it's the little things that cause Hisself to come unglued . . . which is why a wife should always check the flight schedule before she indulges in an indignant account of why she turned the hose on the



commanding officer's wife this morning and just who does she think she is anyway! And say did I mention that Junior stuffed a prune up his nose and don'cha know that he won't get that scuba diving scholarship since no one can scube with a maimed nostril and my gawd that bank should oughta hire bookkeepers who can add because we can't possibly be overdrawn *that* much.

And many a wife has been the cause of a feathered engine or, at the very least, a kinked relief tube, because of her unguarded reactions to Hisself's blue funks, which usually develop in every normal husband at two critical periods of the day—breakfast and dinner. Although the dinner hour at our house has all the serene atmosphere of the Dempsey-Firpo fight, ("git yer elbows off the table, don't eat so fast, clean yer plate, my-gawd this kid will be eating with his fingers when he's thirty-five years old, git the cat off yer lap. . ."), I would say that of the two, the breakfast hour is the more critical period.

This is when, if we wives are to be instrumental in keeping the accident rate down, we must repress the overpowering urge to clout our roommates with their safety boots when the predawn conversation consists of, "and what cooking secret do you use to make these eggs taste like Ben Hur's old sandals" . . . and/or "my, my dear—you look about as sexy as a stopped-up sink in that flannel puptent." Husbandly remarks such as these are usually the signal to square off and have at it. But to insure a tranquil pre-mission mental state in your sky-jock, remember to say absolutely nothing. Indignant rage and revenge can be subtly expressed in other ways . . . possibly you can jam all the zippers on his flight suit or go retch on the seat of his Lambretta.

It goes without saying that family problems occurring during an extended cruise have caused more than one airplane driver to come nose to nose with an unexpected object—like a mountain.

This is a period in his life when he must be spared all worries other than will he win at bingo tonight and how soon can he get an R & R to Waikiki.

Naturally, a long cruise is a bucket of worms to the wives left sitting on their hassocks, and unless Hisself pacifies the little woman with more letters than a once-a-week note, (usually as romantic as the daily bulletin and as short as commissary hours), she will discard all efforts at morale building and manage to let him know that simply because he's three thousand miles away he needn't think that kids, mumps, fights and bills don't still exist fer heaven sakes and a pox on your mental state and what about mine!

Although many a deployment wife is blessed with a husband who, though he reads fairly well, doesn't write, and has often wished that her roving roommate was as prompt and eloquent in writing love notes as he is in filling out his per diem voucher, it is suggested that she refrain from penning any epistle to her absentee aviator that might possibly result in violent chain reactions. Since crippled aircraft beget Commanders into snits; snitted Commanders beget the nervous dizzies in pilots; the nervous dizzies is what begot Hisself into this damned mess in the first place, and all on account of I wrote him the following letter:

Dear Pen Pal:

Will answer your note of three weeks ago before I get dressed for work. Oh yes, I've taken a job to occupy my time while you're away . . . the pay isn't much but ZOWIE!! is it interesting! I'm a BOQ Housemother, 8 p.m. to midnight shift.

By the way, did I tell you that our dog is at the Vet's? No, he isn't sick; he's under quarantine. He bit that Military Police Honcho—the same sorehead who gave me a speeding ticket and suspended my driver's license last week when I accidentally ran through a stop sign during retreat in front of the Administration Building and plowed into a staff car sporting a monogrammed flag the size of a bedsheet. No serious injuries, except to one fella . . . he looked sorta like the Admiral but it was hard to tell with all that blood on him. Come to think of it, it just might've been. Oh well, whoever he is, he sure has a temper!

I won't bore you with the rest of the details—except to say that the damage to our car was slight. Four hundred dollars will fix it up as good as new . . . which reminds me, the last check I wrote seems to have bounced and I guess that's the reason your name was put on some kind of list.

In closing, let me reassure you that everything is under control here at home and no need for you to worry. Fly safe and keep in touch, pal.

Your ever-lovin' wife

P. S. . . . Whaddya know! It was the Admiral.

Like I say, something has to be done to eliminate the "wife errors" resulting in accidents. And it is the everlasting credit of one particular flying safety officer that he tried to do his part in preserving the accident-free record of his outfit. However, because of his own devotion to duty in attempting to erase "wife errors," the poor bohunk was medically discharged with unusual injuries . . . neck bites.

—Adapted from MATS Flyer

Hypoxia / Dry Rot

For the first 35 to 40 minutes, the scheduled night practice radar intercept mission in the F-3B seemed normal—altitude was 25,000 (cabin pressurization altitude 11,000 to 12,000)—and the replacement pilot completed three successful intercepts.

In the minutes that followed, however, the instructor pilot flying in the target aircraft observed a gradual deterioration in the RP's radio discipline, procedures and radar techniques. The RP was confused about instructions given and frequently asked the controller to repeat information. His radar work became less precise compared to previous runs.

Approximately 65 minutes after takeoff, cabin pressurization failed. Cockpit altitude became the same as aircraft altitude. The RP informed the IP of this and stated he was descending to 19,000 feet to continue the mission. Five minutes later, the RP transmitted that he felt sick and was returning to the field. The controller gave him a steer to home plate and cleared him to descend.

The IP proceeded to make a running rendezvous on the RP, catching up with him at 9000 feet, 40 miles out from the field, and in a shallow right turn. The IP steered him back to home base, requesting on the way various cockpit instrument readings to keep him alert. The RP complied with instructions to check his oxygen 100 percent and to shift to safety pressure, and the descent was continued to 2000 feet.

About 14 miles out from the field, shift to tower frequency was accomplished. The RP's position report to the tower again indicated disorientation and confusion. The IP continued to fly a wing position around the traffic pattern and discuss the situation with the RP. Landing was without further incident.

The aircraft oxygen system and regulator checked out. Although it had been checked and cleaned 15 days before the incident the RP's mask was found to have a leaky hose and sticking exhalation valves. The hose had shown slight evidence of dry rot in the folds at the time of the routine inspection, but the inspector had considered it in good working order. (*Slight evidence of dry rot in an oxygen mask hose is reason enough to replace it.—Ed.*) Prior to the flight in question, the mask had been trouble-free.

Until he joined up with him on the way home the IP had not realized that the RP was hypoxic. The RP was, of course, unaware of his own hypoxic condition. Intellectual impairment, the investigating flight surgeon points out, is an early effect of hypoxia. As such, this makes it impossible for the individual to comprehend his own disability.

"Since the oxygen regulator could not be ruled out as the cause of the alleged hypoxic condition at the time of malfunction," the flight surgeon noted, "the emergency bailout oxygen bottle should have been actuated. Oxygen from the bailout bottle enters the pilot's mask at the base of the hose connection and does not utilize the aircraft system."

The flight surgeon recommends that:

- Pilots should take particular care of their oxygen equipment. Have it checked and cleaned at frequent intervals.
- Use the emergency oxygen bottle whenever hypoxia is suspected.
- In the event of any cabin pressurization malfunction at altitude, descend as soon as practicable below 10,000 feet.

Once the IP recognized the situation, he did a good job of saving the day. Would it be realistic drill and valuable training for RAG IPs to pull an unannounced simulated hypoxic situation on students? Naturally there should be advance briefing during the course but some day the student will be a wingman or flight leader with a hypoxic shipmate or RIO. Will he be able to talk him down ok?—Ed.

Short Snorts

Profit by the mistakes of others; there is no need to make them yourself.

Weak Plate

An F-4B was being moved into a hangar for maintenance. As it rolled through the entrance, a metal plate covering a cable trench collapsed allowing the port wheel to fall into the trench. Local Public Works revealed that the plates were rated for a safe single wheel loading of 1200 pounds and would fail under a one-time loading of 3000 pounds.

The plates covering the cable trenches were too weak to support any aircraft, and no warnings were posted or promulgated.

F-8 Gun Platform

An F-8D sustained incident damage when its gun platform collapsed during a firing run. The 20 mm retainer assembly had backed off the lower RH gun, striking and cracking the forward mount fitting. Continued firing of the gun collapsed the gun platform.

Sine Wave

After easing into position, a thirsty F-8D thunked its refueling probe into a KC-130F's basket. The inflight engagement appeared normal in all respects. However, impact between refueling nozzle and basket produced a bow in the refueling hose which was not compensated for by the malfunctioning takeup reel in the tanker. The bow in the hose whipped up to the tanker and back to the receiving aircraft, breaking its nozzle away from the refueling assembly.

Bank Shot

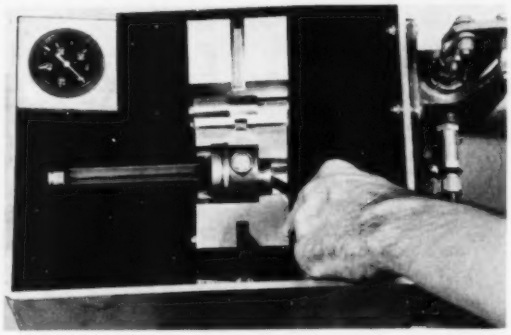
An armed guard attached to a squadron inadvertently discharged his M-1 rifle while walking his post on the flight line. After bouncing off the concrete mat, the bullet slammed into an F-8C, puncturing a ventral fin and rupturing the port aft fuel cell.

Negligent handling of a loaded weapon was the obvious cause of this ground accident. Fortunately, there was no fire.

Flight Control Checks

Do you always check all primary flight controls to their full limits of travel? We suggest that you do so because experience has shown that system malfunction or a misplaced piece of hardware may go undetected if the controls are moved only part way. For the safety and security of your flights, check the controls all the way.—

—FSF Bulletin



Strainer relief valve, center, is seated face down and clamped into place. Pressure from hydraulic pump, right, is read on gage at left. If pressure is above 45 psi (± 7 psi) oil starvation might occur in the engine. If pressure is too low, unfiltered oil will enter engine.

Well Done VT-5

Relief Valve Tester

OIL analysis of 1820 engines in VT-5's T-28s indicated that certain contaminants were bypassing the main oil strainer and getting into the engine. Strainer relief valves were immediately suspected, so a means of testing them became necessary. Drawing on local talent, a jury-rig tester was built using hydraulic pump, oil lines, an oil drum and an oil gage.

Tests of squadron aircraft strainers revealed that many relief valves were not opening at the required differential pressure. Some would not open until the pressure differential was exceeded. This meant that if the filter was clogged and the valve remained closed, engine failure would soon result from oil starvation.

Other valves opened at very low pressures allowing unfiltered oil to enter engines. Abrasive deposits, in turn, were causing a high number of bearing failures.

By eliminating faulty relief valves through the use of this testing device, VT-5 was instrumental in increasing engine reliability and performance. In addition, the attention of BuWeps, contractor, overhaul and operating activities was directed to this problem area. Resulting quality control and quality assurance has been instrumental in the saving of lives, time, money and increased mission-effectiveness. *Good Show*, VT-5.

Inventors Lawrence St. Jacques ADR2, left, and Tom Ruegg AMH2, operate prototype testing device to test oil strainer relief valve opening pressures.

What happens when a man freezes

By Captain William H. King, USAF

Dear Troops,

The topic for this month concerns cold weather, and the human body's response to it. Of course, we shiver and get goose bumps, but let's go a little beyond that. First, let's review a few tech orders as to how the body regulates its own temperature, and the methods by which it will react to thermal stress. Then we will see what can go wrong, how to prevent it, and, as a last resort, how to treat it, if necessary.

You will recall that only a short while ago, it seems, we were discussing heat stroke and other summer hazards. But, of course, unless you are flight-planning for Hawaii or Timbuctu, you can lay that information aside until come grass. But hold onto a few of the basic principles for a moment, because they do not change with the season. Let's give them a low-level-short-look again.

The body's thermostat is housed in sort of a command post, deep within the gray interior of the brain. There a few Betz cells lounge around, giving an occasional glance to the TWX messages feeding into it from the peripheral receptors—that is to say the skin scouts, posted out there on the body's defense perimeter to take notes on the time, temperature reading, wind velocity, ... Generally speaking, these scouts are well-trained specialists, who carry on during all kinds of weather. . . . These scouts' "Job Code Numbers" show them to be specialists in thermal reception, as distinguished from other receptors who may specialize in pain, touch, or body position sensations. They are usually reliable throughout a life span, unless one acquires a certain social disease or sugar diabetes which we will not discuss further at this time.

Meanwhile, back at the ranch, the Betz cells take note of the latest info, and if a cold snap or heat wave occurs, they get up off their dendrites and do something about it! They have a sort of hot line by which they can dispatch messages to the offensive platoon. Under conditions of extreme heat, you will recall that the reaction will be to increase the blood supply to the skin, thus dissipating body heat by radiation. It will also be lost by sweating and evaporation and, to a minor extent, via respiration and other routes. Under conditions of extreme cold, the reaction is just the opposite. Blood is shunted away from the skin to prevent loss of heat, and also to route it to the more vital organs of the body, from the standpoint of survival, such as the stomach and liver, the heart, and, of course, that command post.

You see, those Betz cells are a rather selfish lot. At least, they reason that if they go, all coordination and chain command would be lost, so they protect themselves and other areas essential to life at all cost. If necessary, this is done at the expense of the less essential, peripheral areas. Now, no one would like to think of his fingers or toes, the tip of his nose, or his ear lobes as nonessential, but if the Betz cells are faced with a survival situation, such areas as these will head the sacrificial list.

Obviously, this is not the whole story and several other factors, both external and internal, should be considered. External factors, other than temperature, include wind and moisture, especially the latter, which make things worse. Internally, anything which interferes with blood supply is going to further jeopardize the safety of those fingertips, already blanched white for the sake of those Betz cells. Certain rare diseases and certain drugs can do this, but neither are likely to be present factors if you have just bailed out over North Dakota. However, nicotine can also constrict blood vessels, and if you're still smoking your two packs a day, perhaps you'd best fly southward like the wild goose. Of course, external pressure can also

cut off blood supply, and, while you are not very likely to be wearing a constrictive tourniquet around your arm or wrist, many people will try to achieve similar results in the lower extremity by stuffing a size 12 foot and several layers of thick socks into a size 10 boot.

It's just no good. Whenever the blood supply to a part of the body is decreased, that part not only suffers from lack of heat, which the warm blood brings, but also from lack of oxygen, those vital O_2 molecules which are hand-carried by the red blood cells floating in the plasma. And, as you all know, without oxygen, the organism simply does not survive. Just as the entire body will not survive a total oxygen lack at high altitudes, just so a member part, such as a cold nose-tip or that cold, aching big toe, will fail to survive if its share of the O_2 fails to arrive on a continuous schedule. What ensues is necrosis—simply death—of the tissue cells; when precipitated by cold injury, this is commonly known as frostbite.

Preventive measures are obvious from a consideration of the above. First, strengthen the body defenses. We humans lack the thick skin of a walrus or the polar bear's fur. Therefore (if for no other reason), we adorn ourselves with other insulating materials, namely clothes. Clothes in themselves are not warm, of course—obviously not while hanging in a cold locker room, but they do serve as insulators of the body's own heat when properly applied. You engineering types can tell us that insulation works best in layers, and that several layers of clothes, or gloves, or socks with air space between each layer will work better than one thick layer. Of course, the quantity of clothing worn is limited by other considerations much as the desire to remain mobile—to ambulate, to respirate, and even to micturate.

And don't forget the blood supply—especially not to those parts which are farthest removed from the mainline of supply, and nearest to the hostile elements. Clothing should not be too tight or constrictive, certainly not about the arms or legs at any point. Remember that moisture is an enemy, and predisposes to frostbite. In a survival situation, not only avoid getting wet, but also avoid working up a sweat, as socks or areas of clothing saturated with perspiration are likely to give rise to painful discolored areas of skin beneath. These are the warning signs of frostbite, and if they do occur, despite all of your careful planning and precautionary measures, treatment should be instituted at once.

Treatment can be quite simple, and probably would have to be, in order to be of any practicality in a survival situation. Dry and warm the cold part. How to do that on a cold night in North Dakota? Place the injured hand inside your jacket, next to your warm abdomen, where those Betz calls have shunted the blood supply, or your foot under your buddy's armpit after removing those wet socks. Remember that your own body may be the only source of heat available—heat derived from digestive processes and other chemical reactions within the body, and distributed by the blood stream.

If you are fortunate enough to have a campfire, do not—repeat, *do not*—warm the injured part directly from the fire, as you may further damage it by burning. The injured tissues are very susceptible to further damage, or vigorous rubbing, both of which are to be avoided. The proper method of utilization of the campfire is to melt some snow or ice in a suitable container and immerse the injured part in tepid water. Whenever gentle warmth is applied in any suitable form, the command post will get the message, relent a little bit, dilate a few blood vessels, and let those O_2-laden cells flow through in greater numbers. Then things are looking up again. Of course, professional medical care should be obtained if your first-aid efforts have been too little or too late. Surgical care is often needed for the treatment of frostbite; even amputation of the part is sometimes necessary. Those fingers and toes may not be essential to life, but we have sort of grown accustomed to having them around, and the above outcome is to be avoided if at all possible.

Well, we're not quite going to make it to the bit about the fellow who freezes to death. Let it suffice to say that the unabridged version has the Betz cells, barricaded in their command post, finally succumbing to the overwhelming forces of fatigue, cold, decreased blood supply, and oxygen starvation, as the curtain descends.

But let's hope that that never happens to any of us. With a little bit of luck, and the knowledge and employment of a few simple principles, it will not.

Wear clothes. Dress for where you are flying, as if you might have to walk back. Wear shoes and gloves. But not too tight. Keep susceptible areas of skin clean and dry, as best you can. Guard your nose and ears. (Cup your hands over your face and breathe the warm air into them; cup your hands over the ears and massage very gently, etc.)

You've survived beach parties and are firmly launched into fall—so, play it cool, man—but, stay warm. —*USAF Flying Safety Officers' Kit*

Horseplay

A TRAGIC accident involving horseplay on the line resulted in permanent waist-down paralysis of one of the "players."

Three men in an unauthorized area entered a plane through the open escape chute doors. They examined the cockpit area with curiosity; then their curiosity degenerated into a dangerous game.

One man left the aircraft and closed the outer escape chute door. The other two men found the normal outer escape chute door release, unlatched the uplocks and escaped. They chased and caught the first man, led him to the airplane and had him climb in. Reportedly they told him, "Now it's your turn to find the handle."

After he climbed up to the cockpit, one of his friends closed the outer door and, putting a new twist to the game, held the door closed with his back. Now the door would not open even if the "prisoner" found the proper control. The third man called to him not to pull the "red handle" but he did not hear the warning. He pulled the emergency lower escape handle twice. The first pull produced no results. He had pulled the handle far enough to unlatch the lower door but not far enough to fire the four cartridges. With his friend below holding the door closed with his back, the door did not move. Another pull on the emergency escape handle actuated the cartridge firing circuit, blew the door open, and hurled the man below to the deck. The door struck him on the back as it opened and severed his spinal cord.

No Poopy Suits

NO ANTI-EXPOSURE suits were worn by the crew of a UH-2A though water temperature was 55° F. and air temp 56°. The squadron wears the suits when operating at sea and weather conditions indicate but not usually when "at anchor" since much of the flying is over land.

The UH-2A crashed into the water off the fantail of the carrier. Four boats converged on the scene. Each boat rescued one person some 8 to 10 minutes after the crash.

"I feel that the absence of anti-exposure suits in this case did not prove a danger to successful survival due to the short time spent in the water," the investigating flight surgeon reports. "However, if help had not been so near at hand, the lack of suits might have been a significant factor handicapping survival chances. Anti-exposure suits should be worn whenever flying over water and the air and water temperatures indicate, whether at sea or at anchorage."

Modified Garters

A MAJOR discrepancy came to light in investigation of equipment used by a pilot who ejected after a midair collision.

The pilot's leg restraint garters used with the M-B F5A seat had been modified locally. The straps had been halved and sewn to the legs of his anti-G suit. On ejection, three of the straps tore away; the fourth was useless because the anti-G suit tore.

BACSEB 5-60 describes local manufacture of leg restraint garter assemblies for the Martin-Baker escape system and their integration with the summer flight suit. It does *not* authorize cutting the straps in half and it does *not* authorize their integration with the anti-G suit.

The pilot in question went out at an altitude between 4000 and 5000 feet. He sustained only minor injuries.

With such an unauthorized modification, the leg restraint garters may position the legs initially but if ejection takes place at high "Q" (dynamic pressures) they will not prevent flailing of the legs with resulting severe incapacitating injuries.

Detach Hose

THE A-4 pilot's difficulty in boarding his raft because of the seat pack's tendency to float between him and his raft was caused by the oxygen hose which remained attached to the seat pack. Squadron safety briefs have not included the mention of the necessity to remove this hose prior to boarding the raft. They are being modified accordingly.—*Flight surgeon's comment from an MOR.*

Makeshift Buoy

A SURVIVOR of a P-2E accident discovered that putting his helmet upright in the water, trapping air in it, and pulling his flight jacket over it helped keep him afloat. He felt he could have stayed up by this method even if he had not had an inflated life vest.

a passenger named

LUCK

Luck was riding along with the three-man crew of an EA-1E which went over the side of a carrier after an unsuccessful night landing attempt. As the three men escaped from the sinking plane, in expectation of quick rescue *they left their parachutes behind*. Sea state was Four with 20-knot winds . . . 55° air temperature . . . 58° water temperature . . . and no anti-exposure suits.

What was that about luck?

As the aircraft went into the water, it dislodged a number of 20-man raft packs stowed along the side of the ship. Ten minutes after the accident, the survivors sighted a raft pack 20 yards away and swam to it.

Holding on to the pack, the pilot fired several night distress signals. A helicopter, which had already located the men in the water by a survivor's vest light, now moved overhead and spotlighted their position. Meanwhile, the pilot had inflated the raft and all three men had climbed in.

Seas were rough. Helicopter rotorwash continually blew the raft away. Heavy swells caused the helo's altitude to vary from 45 to 60 feet. Instead of swimming to the rescue sling the survivors elected to stay with the raft. The helo pilot later stated he concurred in their decision under the circumstances.

Among the helo pilot's other comments was that the reflective tape on the pilot's helmet readily showed up among the papers and debris scattered over the area.

A plane guard destroyer drew alongside. Crewmen threw a line to the survivors which they made fast to the raft. At first, the raft drifted precariously in front of the destroyer's bow but it eventually became stabilized alongside the ship. The men were taken aboard one by one on a metal doughnut seat.

The investigating flight surgeon considered it quite possible that without the raft, one or more of the three men would have perished in the rough seas. He reported a number of areas for improvement in this accident:

- The men were not equipped with anti-exposure suits even though the combined sea/air temperature made their use mandatory as directed by NATOPS. An endorser to the accident report pointed out that Mk-4 anti-exposure suits were available but that "desire for and requisition procedure involved in procuring Mk-5 controlled issue suits obscured the fact that Mk-4 suits were available and should have been drawn by the detachment."
- One man had no personal survival kit. Another had only one-half of a survival kit which he carried in his hard hat bag and left behind when he exited the aircraft.
- None of the three men in the accident had ever fired a Mk-13 distress signal flare and none was familiar with the instructions on the container.
- One of the men carried his survival knife in his hard hat bag rather than on his person. It was, of course, left behind in the aircraft. Another carried his survival knife tucked behind the chest pockets of his mae west with the oral inflation tube of the mae west passed through the top of the knife sheath. If the oral inflation tube must be used to inflate the life vest, it cannot be freed from the knife sheath quickly. To bring your head down to the tube in its secured position on the chest is not always possible.
- One man carried his .38 caliber revolver unloaded.
- It was one man's practice to loosen the chinstrap of his hard hat prior to takeoffs and landings. This is in direct opposition to the generally taught and accepted procedure.

Among the flight surgeon's recommendations was that more emphasis be placed on drill in the proper use of survival equipment. Thorough knowledge in the use of all survival equipment should be demonstrated by each person on a flying status. The type of training, he says, is truly a matter of life or death.

Few accidents can be attributed to pure pilot error—most have a malfunction or poorly designed hardware somewhere in the chain of events. Yet, we are prone to

HERO or

Why don't we analyze accidents from the cockpit instead of comfortable office chairs? Too often after an accident, armchair analysts dissect, examine and redissect all the courses of action open to a pilot which might have prevented the mishap. Just coming up with the possibilities can take the better part of an hour, day or even weeks. Yet a pilot faced with death is expected to do it all in 10 seconds or less.

Too many accidents are scrutinized with only one thought in mind—to criticize the aircrew. Here is where our prevention effort becomes diluted and gets pointed in the wrong direction.

We give our aircrews the prerogative of making decisions, stick them in aircraft that are far from perfect, then wait for them to make crucial decisions. Preoccupation with the pilot's actions will not help our prevention efforts one whit since no two pilots will react the same in a given situation. Furthermore, you can't go back and replay the occurrence to see if another jock could have made it.

Take the case of the pilot and student in a TF-102 on final. The student had leveled off at the prescribed altitude of 500 feet, put speed brakes in, and had simultaneously advanced the throttle to military. Only one catch—the RPM didn't move from 76%. So there they were—500 feet in the air with gear down and 5000 pounds of fuel aboard.

The pilot took the bird immediately and tried to diagnose the problem. He moved the throttle—nothing happened; as a last resort he slapped it into burner. Meanwhile, the airspeed was rapidly bleeding off. Realizing after a couple of seconds that nothing was going to happen, he dumped the nose, hoping not to get more airspeed, but to keep what he had while he made for the runway. He was around 160 kts at this time. He tried to break his descent and flare, but didn't have a prayer. The impact was so hard it knocked some instruments out of the panel. The left main gear was driven into the wing, the right main folded and the nose gear failed. Pilot and student evacuated the bird safely after it came to a screeching halt.

Now let's give these pilots the same malfunction and put the aircraft at 20,000 feet, 100 miles from the nearest usable runway. Now what do you have? That's right, another accident—the aircraft cannot sustain flight, we have a double ejection, and the monkey's off the pilot's back. Why? Because he had the time to do everything possible to save the bird before ejection. The only difference in the pilot's actions would be that in the first case, he did not make a decision—he only acted *instinctively*. In the latter, he had time to think and made *decisions*. The aircraft was lost in any case.

The criteria, then, which determines whether you are a hero or bum, is twofold. First, you must be involved in an accident and bend a bird. And secondly, if anyone during the next 30 days, can figure out a way you could have made it—you're a bum. If they can't—you're a hero.

Simple—you bet—And the fact that pilots, supervisors, commanders, and investigators use this criteria is disturbing. To continue this line of thought further let's take the case of overheat lights on the takeoff roll. The standard abort procedure says abort if enough runway remains and press on otherwise. But there is one hooker here—pilots do not make de-

jump the jock for what he should've done . . . could've done . . . or say what I'd have done. . . . These observations point out why we shouldn't.

BUM

cisions during a high speed abort! They act instinctively when only seconds are available. Along with overheat lights we have some other cases. How about the pilot who aborted takeoff because the RPM gage failed, or the pilot who heard or felt a rumble on the takeoff roll during a *T-bird* test hop? The EGT had crept up over 715° and he aborted—in both of these last two cases the birds got bent. Where was the fault, in the heads of the pilots or in the hardware that failed?

Here's another one—a T-39 pilot aborted for a fire warning light right at nose wheel lift-off and creamed the gear after running into an obstruction off the end of the runway with no barrier. Yep, the light was false and on the same engine that had one a few flights earlier. Incidentally, the cause of the false light was found and fixed after the accident.

Should this pilot fall into the "Bum" category because he didn't press on with the takeoff? Or should the people who supposedly "support" him get the tag? His decision to abort didn't occur when the overheat light illuminated. He reacted instinctively and his actions were a product of his past flying experience, past emergencies, his knowledge of the bird, . . . Had he had time to think it over with a cup of coffee in hand like we do—he might have done it differently.

Emergencies on takeoff or at low altitude make our "Heroes" and "Bums." The only difference, again, is whether or not somebody, at their leisure, can come up with a logical procedure that would have prevented the bash.

The answer then, lies not so much in changing handbooks and writing new regulations—but getting at the system that caused the emergency and demanding that it be fixed.

Here is where you people at the squadron level come in. Now, you can't run up and down the levels of command demanding something but you can report system failures conscientiously and thoroughly—this will serve the same purpose and get the word out so our birds will get fixed.

We use the phrase "Material Failure" to cover accidents in which a part failed. After the second or third time, how can you call it "Material Failure"—it wasn't the "Material" that failed, it was us! We know, without a doubt (whether we'll admit it or not) that certain pieces of equipment will fail again because nothing has been done to improve them. Yet we continue to be amazed and saddened each time one of these systems crumps. Pressure, in the form of exposing any aircraft system which is substandard, can help get a fix.

We can reduce the critical emergencies being experienced by our pilots only by reducing their exposure. This means "fixing" instead of lip service in the form of a report or message. It also means that, when we analyze an accident of this type, it should be done in the same manner as the pilot was forced to do it. Everyone including the Accident Board, the Reviewing Authority, Headquarters Staff, the Aviation Center and BuWeps must put themselves in that ejection seat. Only in this manner can we spotlight our true accident causes so they may be corrected. And only then can we really decide whether the pilot is a "Hero" or a "Bum."

—Adapted from "Interceptor"

BEFORE the FIX is ON

By CDR D. M. LAYTON, NASC

Because fixes require tremendous amounts of time, effort and money—all of which we're short of—judicious use of what's on hand is a must. Here are the scenes behind the scene of how it's being done.

For the last three fiscal years the Navy has witnessed a steady decline not only in the aircraft accident rate, but also in the total number of accidents (Figure 1). Those accidents in which material failure was judged to be the primary causal factor also showed a numerical decrease throughout this period. Also note that the percentage of accidents with *primary* material failure involvement remained level from fiscal 61 to 62—dropped only 4 percent in fiscal 63 *and is now on the upswing* (Figure 2).

Relating the accidents in which material failure was either the primary or contributing factor to the total accident picture, we find that the percentage in fiscal 62 and 63 was higher than in 1961 and still higher in fiscal 64 than at any time during the last three years (Figure 3). The cost of these accidents has been increasing at about 10 million dollars a year and may reach 140 million dollars this year.

System Failure Record

Broken down by major system failures, the average distribution of the 439 *primary* material failure accidents for the past three years is shown in Figure 4. Nearly two-fifths of these accidents were caused by power plant malfunctions and almost a third were caused by airframe group failures. The landing gear, shown in parentheses as a sub-system under airframes, accounted for 26% of all material failure caused accidents. These landing gear failures do not include those caused by pilot error or maintenance error. Flight controls contributed 6% of the accidents, avionics (a recent newcomer with the advent of AFCS and ASE) had 4%—12% were material failures wherein the exact system could not be determined and was labeled as undetermined. The 7% miscellaneous category includes those items with few occurrences but high criticality such as ejection seats, fuel systems, ordnance, pressurization and oxygen.

A breakdown of the airframe group (Figure 5—on next page) shows that landing gear failures account for 80%, basic structural failure 14%, and 2% each for catapult and arresting gear failures, brake failures and utility hydraulic failures.

About 70% of the turbo-jet power plant failures have been in the basic engine parts with failures in engine accessories accounting for the other 30%. Reciprocating engine failures have been concentrated in reciprocating assemblies, master rod bearings, cylinders and exhaust valves. As of the date of this writing, there have been no accidents caused by failure of turbo-shaft engines in fixed wing aircraft in the Navy.

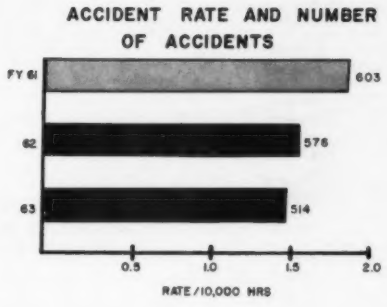


Fig. 1

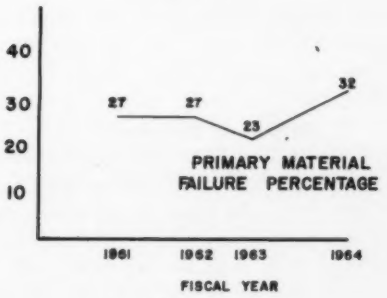


Fig. 2

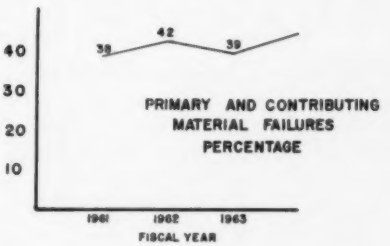


Fig. 3

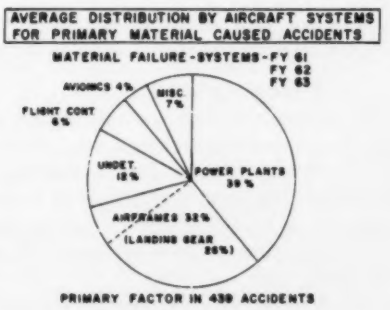


Fig. 4

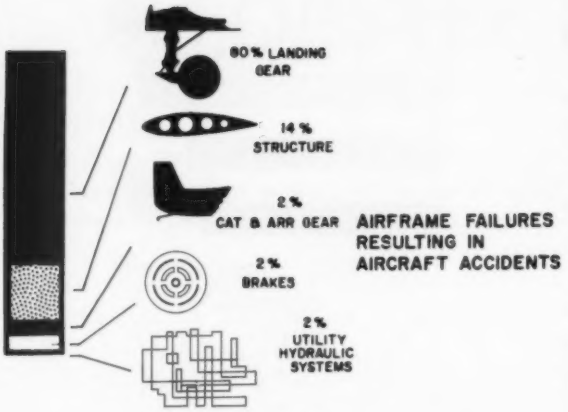


Fig. 5

Effect on Reliability

Do these accident causal factors give a true indication of the reliability of aircraft weapon systems?

Not at all. In the first place we are discussing mishaps and not the periods that are mishap-free. The average flight time between material-involved accidents is currently in excess of 17,000 hours!

The basic index of the material reliability problems of an aircraft is compiled by examining not only mishap data but also FUR reports and incident reports.

One oddity here—a survey conducted at the Naval Aviation Safety Center indicated that, in general, the high frequency failures reported under the BuWeps Malfunction Reporting System contribute very little to accident causes. This may well be because of the increased attention and publicity that is given to these items when an accident occurs, resulting in increased awareness of the trouble and increased maintenance effort to cope with the problem. Criticality of the system is proved by the very nature of these accidents and it is obvious that you don't need two accidents to prove that one can happen.

Methods of Correction

Material deficiencies in a system, whether due to underdesign or overusage, are generally corrected by the Aircraft Service Change/Engine Bulletin method. Only three basic items are needed to accomplish this: time, money and effort. To obtain such a change is a long and perilous journey. Let us consider the usual steps:

First of all there must be established a definite requirement. This can come in many forms, separately or collectively. Often one catastrophic accident will offer ample justification for major changes. It is more likely, though, that the need will be generated by a series of mishaps or near mishaps. Herein lies the necessity for reporting from the operator level. Malfunction reports must be submitted in detail, with pictures if applicable, with proposed solutions, with follow-up if more information becomes available, and with an expression of urgency if need be.

Recently the Aviation Safety Center received a material malfunction report from an east coast squadron with the statement that this was probably an isolated occurrence. The same day a report of the same malfunction was received from a squadron on the west coast. Information from the Safety Center's Liaison Officer with the USAF Directorate of Aerospace Safety disclosed that the USAF was having the same problem. Wheels began to grind rapidly to correct a situation that might never have been found until after an accident or two had occurred if these squadrons had not reported their *isolated* occurrences.

Once it is established that there exists a bona fide requirement for a change, BuWeps asks the contractor for an Engineering Change Proposal (ECP). This is a formal proposal of the change and indicates the required depth of work, supply data and costs.

IBCC Control

Navy approval of an ECP is accomplished by the BuWeps Intra-Bureau Change Committee (IBCC). This committee (referred to phonetically as the "Eye Bee Deuce-Cee") is under the chairmanship of the Assistant Chief of BuWeps for Plans and Policies. The voting members are the Chairman; the Assistant Chief for Research, Development, Test and Evaluation; the Assistant Chief for Production and Quality Control; the Assistant Chief for Fleet Readiness and Training; and the cognizant Program Director. The Associate Members (nonvoting) are the BuWeps Safety Officer, the Specification Representative, the Contracts Group Purchase Division representative and the representatives of the Aviation Supply Office and/or the Ordnance Supply Office, as appropriate.

Factors Considered

In order to provide for stabilization of the weapon system, only changes of the following nature are considered for incorporation:

1. Safety changes.
2. Correction of defects due to either the contractor or the government specification.

3. Improvement changes to provide increased reliability/maintainability or improved performance.

4. Cost-saving changes that do not degrade safety, performance, reliability, maintainability or other desirable characteristics.

The case for the proposed change is presented by the officer having the cognizant BuWeps desk and a unanimous affirmative vote is required for IBCC approval.

It is to be noted that this is an extremely simplified version of the procedures involved. The required paperwork is great but is quite necessary since these changes involve legal contracts with civilian companies, technical changes to complex systems and the expenditure of large sums of money.

Money is a word that ranks second only to safety in the consideration. Without the deliberate actions of the IBCC, we could well find ourselves having spent all of the available funds for convenience improvements and have none left for safety of flight changes.

Old vs New Aircraft

In December 1963, BuWeps adopted a recommendation of the Naval Aviation Safety Center that safety of flight changes to aircraft that are no longer in production may be approved without formal IBCC action, provided that:

1. The engineering aspects of the proposed change are acceptable to appropriate elements of the Research, Development, Test and Evaluation Group (RDT&E) of BuWeps and the support aspects are acceptable to the Fleet Readiness and Training Group (F).

2. The technical directives can be prepared within the Bureau or in certain instances by an O&R activity.

3. The cost of material is nominal and the material required is available from local stock.

Existing instructions permit the contractor to proceed with safety of flight defect changes to aircraft in production prior to receipt of approval from BuWeps—provided interim approval is obtained from the cognizant BuWeps representative and an ECP is submitted to BuWeps for final approval of production and retrofit incorporation.

Time for Action

Now that we have approval of the change, the problem has just begun. The contractor must procure or manufacture subassemblies, assemble and ship retrofit kits, furnish revisions to manuals, maintenance cards, allowance lists; ship spares to supply points; and provide for retraining where applicable. It is obvious that regardless of the urgency, this process is time consuming. We must also consider the task of change incorporation. Drilling of a hole or putting a lock washer on a bolt can be done on the line, but many modifications require special skills and special tools and must, of necessity, be programmed to be accomplished by a Field Team or when the aircraft returns for PAR.

In the meantime, the man who submitted the first report has left the squadron, muttering, "They never take action on my reports, so why make them?"

Effect of FURs

Even in the smoothest chain there are many links, but break one and the ends can be stretched indefinitely. A failure to report, a failure to properly communicate the extent of the problem, a failure to express the correct degree of urgency, or a failure to recognize the essential quality of a report can all break the chain. Remember that the difference between a FUR and a Safety of Flight AmpFUR is often only a matter of time, phase of flight or environment—and that a Safety of Flight AmpFUR is often a material failure accident that didn't happen. A material failure accident only indicates a spectacular failure in the reliability updating for a weapon system. Lesser failures in reliability are indicated on a daily basis by malfunction reports.

We, the operators, have two parallel plans of action.

First, we must be certain that we are not "accessories before the fact," that we have not contributed to these failures by misservicing or poor maintenance. A poorly-serviced landing gear can have symptoms similar to one that just up and died, and an overtorqued bolt may cause as much damage as one that has been omitted. It behooves us all to follow the book, under constant supervision, with attention to detail.

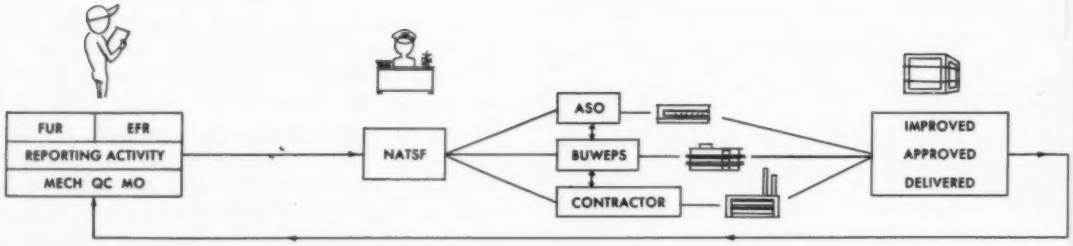
Secondly, when failures or malfunctions occur, they must be reported promptly, completely and in context. If a state of urgency exists, say so.

Bending the Material Failure accident curve down towards the zero line is an all-hands job. Are you doing your part?

BIMRAB Meet Set

The next BuWeps-Industry Material Reliability Advisory Board conference is scheduled for early May 1965. Theme of the meet is "Contracting for Reliability." For additional details write Mr. Frank W. Snyder, Secretary, BIMRAB, Bureau of Naval Weapons, Washington, D.C. 20360 or call Area Code 202. OXford 65748.

Feedback Via the FUR



Get the ill in the mill! There's no better way for before-the-fact accident prevention than using a system which collects data on malfunctions and which does something to correct those malfunctions.

Purchasing, distributing, issuing and disposing of aviation material does not completely define the broad mission of the Naval Aviation Supply System. In addition to these functions, we must obtain assurance that the items in the bins, on the shelves, or in transit are of a quality which will be entirely satisfactory when placed in their end uses. Furthermore, when such items are used in an aircraft performing its assigned mission, their failure rate must not exceed certain calculated acceptable limits. To approach this goal ASO places great emphasis on enforcing the quality control and quality assurance provisions of the procurement specifications and contracts; maintains close liaison with the Material Inspection Service; and makes a careful analysis of Failure, Unsatisfactory or Removal reports (FURs).

The Naval Air Technical Services Facility has the responsibility to collect FURs and compile information from the reports. NATSF is located on the same Government compound as ASO, in Philadelphia. Copies of the individual FUR reports are forwarded to ASO on a daily basis (as received by NATSF) when the cause of the trouble is indicated as:

Design deficiency.
Faulty manufacturing/inspection.
Damage on receipt.
Fluid Contamination.
Faulty preservation.
Undertermined/other.

These reports contain the important feedback information which facilitates the early detection of faulty equipment, parts and material in the Naval Aviation Supply Distribution System. Based on its ability to obtain this information on a timely basis, ASO takes immediate action to analyze the reports, obtain replacements or other retribution from contractors. Holdings of defective items in the inventory are screened and subsequently removed. ASO Instruction 4700. 8 of 2 April 1963 details ASO actions. These experiences are used to improve specifications for future procurement.

Following are a few items for which corrective actions in ASO were triggered by FURs:

Part Number	*Nomenclature*	*Federal Stock Number*	*AmpFUR*
S10-10-1419-3	Boot - Protective	R1560-676-2510-ASKY	NorIs 34
CV21-490503-1-500	Glass - Canopy	R1560-562-4499-ACVA	NorVa 155
121GT10008	Wrench - Torque	R5120-675-2093-SGRA	Glenview 472
5670882	Covers - Exhaust	R1680-723-6632-SDGA	VA-43 490
H300/S317	Isolator - RF	R5840-717-9269-FGPS	NorIs 158
SB1100-2	Bearing	R3110-620-2819-ASKY	NorIs 98
5548404-23	Lap Assembly - Hydraulic	R1650-653-3768-ADGA	Jax 343
Model 220	Gun - Grease	R4930-524-6915-S231	Jax 421
Mil-C-18767B	Compound - Cleaning	R7930-634-5340-G500	NorVa 161

These items are probably well recognized by the supply components who were troubled by them. *Tell what you know about items in your supply that are bad.* A properly filled FUR is the best vehicle to do the telling.

On 18 October 1962 the Secretary of Defense established the Department of Defense Cost Reduction Program. This project, covering fiscal years 1963 through 1965, is designed to reduce annual procurement and logistics costs within DOD by three billion dollars. As a corollary of this program, the Navy's program to maintain a constant vigilance with respect to the quality of its supply material becomes increasingly important As we reduce the number of items available to maintain our aircraft, it becomes imperative that the material drawn from stock to satisfy and end use requirement will be completely satisfactory. We cannot afford the luxury of abundance to counteract the effect of poor quality, malfunctioning, or design deficiency. Again, the Aviation Supply Office must rely upon the feedback information from the field and supply system in the form of FURs to signal the need for corrective action.

The "Breakout" program, wherein items which were formerly purchased on a single source basis are now bought on a competitive basis, brings many new suppliers into the naval aviation supply picture. With this fact in mind special emphasis has been placed on Quality Control and Quality Assurance requirements in current specifications and contracts, and Material Inspection Service has been alerted to the extra caution required in these cases. However, the final test of acceptable quality and effective design is whether the articles issued by the supply system perform their intended function satisfactorily and maintain their reliability in their final application. Only through the diligent use of FURs will the Aviation Supply Office receive the feedback information so vital to the effectiveness of the Breakout program.

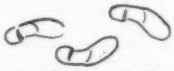
How can the personnel in the supply department participate in this extremely important information feedback system? They can be of invaluable service in the following ways:

- By being alert and sensitive to the need for reporting promptly malfunctioning or excessive failure of supply items. By suggesting to those in the field that when such parts are received that FURs be issued to help rectify the situation.
- By dispelling the erroneous idea, which apparently is accepted among some of our customers, that only repairable exchange type items are reportable on FUR forms. All malfunctioning, excessive failure or defective manufacture items are reportable, regardless of whether they are repairable, exchangeable or not.

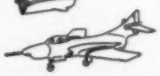
When faulty material is received or the material is received indicating faulty packaging or preservation, report the situation immediately through the FURs to NATSF, Philadelphia. NATSF will provide ASO with a copy for action without delay.

Feedback information is a *must* for the efficient operation of the Aviation Supply System. Get behind the FUR program and give it a push. ASO needs your continued help and cooperation to give you the best in high quality material adequate for its purposes. — *BuWeps "Aeronautical Material Reliability Digest"*

For the want of

During a normal intermediate check of an AF-9J, the  was removed utilizing a  and it was then towed to one side of the  Because one of the  in the tail stand retaining clamp was missing  and it was at least  to get another, a  slightly smaller than the threaded hole in the clamp was used  and without a  . After several hours of the worked free, causing the tail to fall back striking the bulkhead and deck.

Total cost for repair part $2,332. Total time for repair, 35 man hours.

For the want of a  a  was lost, for the want of a  a  was lost, for the want of a  no  was trained for the want of a  a battle was lost etc. etc. etc. etc.

(1) Follow current squadron procedures for securing the tail sections to the tail stand.

(2) Check and recheck that the proper size bolt is being utilized in the retaining clamp and no matter if the clamp is threaded or not always use a nut on the end of the bolt.

(3) WHEN IN DOUBT-FIND OUT !

art and text by 1st Lt A.R. Atkinson and Marine Cadet R.J. Maikis, VT—25 flight students

MURPHY'S * LAW

Martin-Baker Murphy

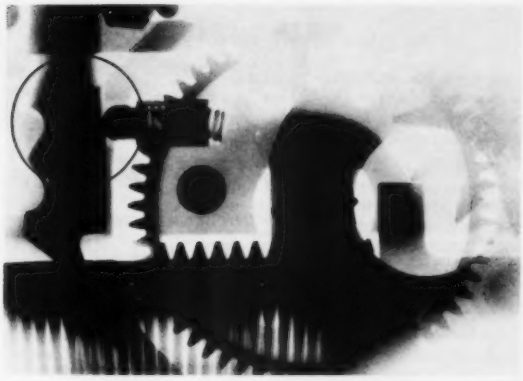
DURING PAR a Murphy condition was found that could result in inadvertent actuation of the Martin-Baker ejection seat drogue gun assembly.

Prior to disassembly for incorporation of ACSEB-22-61 and ACSEB 22-61A, cocking operation was checked and noted that it could not be accomplished using normal procedure and operating sequence. Without disturbing the assembly, the following procedure was used for recocking the drogue gun held in a fixture:

a. Sear pin was inserted

b. Cocking tool was pulled all the way back

c. Quick release pin was pushed down holding firing pin in cocked position.



X-ray photo revealed reverse installation.

The drogue gun assembly was then purposely jarred and *it actuated*. X-ray photo, above, verified that the quick release pin 14842 was *installed and rotated 180 degrees from the correct position* in the assembly. This situation precludes positive locking of the firing pin when in the cocked position and the spring-loaded friction catch will not engage the detent groove in the quick release pin.—*NAS Alameda Flight Safety AmpFUR via NATSF.*

* If an aircraft part can be installed incorrectly, someone will install it that way!

Wanted — Murphys

SINCE the establishment of the Naval Aviation Safety Center (NASC) and the Naval Air Technical Services Facility (NATSF), numerous reports of Murphy's Law designs have come to light via accident/incident, Anymouse and FUR reports.

It has been the practice of the NASC to alert Fleet personnel of any known Murphy's Law situations through APPROACH. NATSF has also, from time to time, described Murphy situations through the BuWeps Aeronautical Material Reliability Digest. Similar efforts will be made to alert airframe contractors and component manufacturers of such conditions in order to reduce or eliminate the introduction of these undesirable design features in new production aircraft. Quite often a Murphy situation discovered in current or out-of-production aircraft reappears in the next generation of aircraft.

This condition is largely due to the breakdown of communications between the operators, the manufacturers and their designers. To improve this situation, a compilation of reported Murphy conditions by aircraft model and by aircraft system will be made available to manufacturers as well as the operators. In support of this effort, copies of all FUR reports concerning erroneous and/or reversed type installation will be forwarded by NATSF to NASC.

In addition, operating activities have been requested to forward information concerning Murphy situations (*ref. Weekly Summary 6-12 Jul 64*) to NASC. Have you sent us yours?

Letters

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

Hero or Bum?

New Orleans— . . . "Hero or Bum," is in my opinion highly deserving of reprint. It concerns the analysis, both professional and amateur, of aircraft accidents and poses the question of "time and involvement."

It questions the assignment of cause or blame to pilots who have reacted to a hairy situation in a fraction of time and who are later classified as a "Bum" after days of deliberation by a group of cigar-smoking, coffee-drinking, relaxed individuals whose reaction time is affected only by the proximity of 1630 or gentle nudges by their CO to meet the 14-working-day deadline. In my 26 years of association with aviation I have observed a strong tendency on the part of aviators and other types, to always be ready to expound loud and long in AARs and sea stories alike, that Old Joe should have—, Old Joe could have—, or I would have—.

Wide dissemination of this article just might help to make *more* heroes and *less* bums, and even possibly lead to more thorough aircraft investigation and the improvement of aircraft design safety and operating procedures.

The author of the article should have written it sooner. OOPS!

P. T. BANKSTON, CDR
MAINTENANCE OFFICER

• Concur! "Hero or Bum?" is herewith reprinted on pages 36-37.

Knife Case

Lakehurst, N. J.—This squadron has found the present method of carrying the survival knife in a zippered case inadequate to meet the needs of helicopter pilots. Working from the premise that on occasion, when a helicopter pilot needs his knife, he needs it immediately and should not run the risk of the zipper catching or the knife catching in the zipper and case, we designed a basic knife case which can be used by all aviators with the possible exception of very high speed aircraft. Location on flight clothing is at the discretion of the user based on the requirements of the aircraft being flown.

The major innovation in this design was the use of velcro. All pilots who have examined the new design using this material have been satisfied. A qualified aviation equipment specialist and all available pilots held informal critiques on various models and evolved the finished product.

Features of the design: 1) Cover pulling downward leaving knife exposed and unencumbered. 2) A tight pocket for security of the sheath. 3) Snaps on back of leather sheath and canvas case allowing the two to be secured to each other. 4) An elastic fastener strap for additional security. 5) A lanyard or thong attaching knife itself to case. 6) Snaps, although primarily for security, forming a pocket for stowage of lanyard. 7) A tab (not a loop), on the cover, with end doubled over providing a grip with which to open cover even with wet or oily gloves. 8) Leather or

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

canvas reinforcement preventing excessive wear at top of knife handle.

The size of the lower outside half of the case should allow the easy addition of a pocket for the pencil flare kit when it becomes available. The case takes about 20 minutes to make. If desired, the leather handle retaining strap on the sheath can be removed for unencumbered access to the knife, since the case contains the knife securely until it is deliberately opened.

Velcro offers many advantages: The knife won't catch on it as it does on a zipper. It affords a quick draw when compared to the zippered case. It still shields the knife from snagging in the cockpit. It protects the knife from inadvertent loss. It is ideal for the quick ditch situation found in helicopter operations.

Stock numbers for velcro (APA purchase items) are:

RS 5325-792-9226-L980
Tape; Hook 1 ft. each
N 383-82396A
P/N: V320-1-100-46-4
A/6/63

RS 5325-795-1087-L980
Tape; Pile 1 ft. each
N 383-82369A
P/N: V320-2-100-46-4
A/6/63

A. A. TONKOVIC
CO, HU-4

• HU-4 advises it will be glad to supply any interested squadron with specifications and photos of their survival knife case in exchange for ideas for improving it.

Doing What Comes Natch

San Diego—Page 14 of the Sept issue of APPROACH carried an inspection article stating, ". . . a screwdriver is normally placed horizontally between the horizontal stabilizer and elevator during maintenance of the flight control system to keep the elevator in place."

An aircraft has yet to be built which possess a zero lethal capability. In this particular case, although I have no idea of what model aircraft is involved, it is a safe bet than an enterprising mech or metalbender could easily make a special tool to replace the screwdriver and afford a visual signal (red streamer) as apparent as downlocks, pitot covers, ... Maintenance manuals should specify use of rigging pins, locks, or battens. . . . The use of a screwdriver for a substitute should not be "normal."

H. B. THORNSEN, LCDR, USCG
ENGINEERING OFFICER, CGAS

• You're right, sir—the use of screwdrivers, or vice grips to hold flaps up, and similar jury rigs should not be normal.

This practice should be discouraged. We make this plea to all enterprisers to cut us in on how they are handling this problem and to put the FUR system to work—it's the right way to get changes made to the maintenance manuals.

Deter the Detergent

Chicago—Page 31 of the Sept issue carried an article suggesting the use of detergent in place of protein base foam for training purposes in the interest of economy.

This procedure could be extremely dangerous since even minute amounts of detergent remaining in the foam proportioning system of the apparatus will have a serious detrimental effect on the foam liquid concentrate. The article, originally published in the ALPA *Tech Talk* has since been retracted.

The National Fire Protection Association's sectional committee on Aircraft Rescue and Fire Fighting universally agreed that the use of anything other than protein-based foam liquid concentrate in equipment designed for this material can result in serious consequences and should be discouraged. Representatives of the Naval Research Laboratory concur with this opinion.

J. J. BRENNEMAN
FIRE PROTECTION ENGINEER
UNITED AIR LINES, INC.

• Thank you for the advice. We join Tech Talk in taking the advice of the experts and say to our readers—Don't use detergents—use foam only in fire fighting equipment. If you're among those having spare equipment which can be used for training purposes only, then the use of detergent may help save a buck.

Shoulder Holster

Santa Ana, Calif.—On page 37 of the September APPROACH under "Notes from Your Flight Surgeon" there was a paragraph on the proper shoulder holster to be issued and worn by aviators. At the risk of offending a few of our fine flight surgeons, I submit that the type of holster I wear is my business, NATOPS' business, 3rd MAW's business, squadron business, as a matter of fact everyone's business except a flight surgeon's. This might be nitpickin', but I feel that it is out of place. (If you print this, please withhold my name as I may need the services of a good doctor again!)

MADMOUSE

• Medicmouse says tell you just relax, this isn't going to hurt much: the item on the shoulder holster came from Chief BuWeps in the final endorsement on a UH-34D accident. Ouch?

approach Vol 10 No 5

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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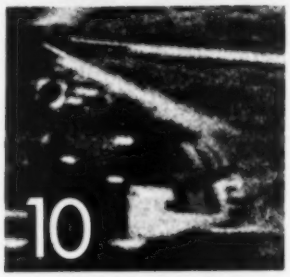

NavWeps 00-75-510

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(middle) Photo courtesy Grumman Aircraft Engineering orporation
(bottom) Photo courtesy McDonnell Aircraft Corporation

Page 47—Cartoon by Allan Jaffee courtesy Publishers Newspaper Syndicate

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COMMANDING OFFICER'S MEMO TO SAFETY OFFICER

Mike,

Subj: Your Job

The pilots that you see around the Corps today with 15-25 years of flying experience are doing so at the expense of many of their old friends. Charlie flew up a blind canyon in 1943, Bill and Roy repeated this maneuver in 1944 and 1945. Almost quarterly someone dramatically pointed out the results of target fixation, stall/spin at the 90, scooping out of a roll over the old homestead, and trying to make a 180 back to the field after an engine failure following takeoff. These and a whole host of other accidents caused by pilot, maintenance and material inadequacies have been discussed and debated in so many readyrooms and "Dirty Shames" that few of the old timers will fall victim to similar accidents.

Today's young aviators don't have the benefit of the mass carnage of former years to build a storehouse of aviation wisdom that will give them sufficient background to cope instinctively with unusual situations. Thank God for it! And thanks to the NASC and the powers that forced the present concept of aviation safety upon some of us reluctant old timers. For this present system provides the wherewithall for our young pilots to gain the experienced background which is so vital to survival in the air. Each senior commander in our operational and administrative chain of command devotes a great amount of his time to pushing information down to us. Each of them has full time specialists who try to make this information as tasty as an icy cold dry martini. We are at the end of the line—the consumers, the ones for whom all effort is expended. So what do we do with it and where do we go from here?

In the aviation safety area, you are my eyes, ears, mouth and foot. You are not my spy, you are my alter ego. I want you to peruse every aeronautical paper that is channeled into this squadron and as soon as you see that something is pertinent to a particular department, I want you to bring that item to the attention of the appropriate department head. Then the next day I want you to follow up and make certain that the mechanic who is cognizant over the item actually has the information and is complying with the directive, recommendations, or suggestion. I don't want you to bring me reports on pilots, maintenance personnel, or procedures, that are indicative of noncompliance with SOP or directives until you have taken corrective action. Just as I trust the executive officer to have the judgment and maturity to handle any problem without reference to me, I trust you to operate in your area in a similar fashion. You are my executive officer for aviation safety. It's a full time job if you prowl, probe and disseminate as you should.

Come and see me any time about any matter, but I expect to hear from you most often when you are providing all of the pilots with essential information concerning our aircraft or our procedures. When I goof I'm fair game—if you don't let me know chances are no one will.

You have a good job. It's important, interesting and rewarding. Make certain that our pilots have the opportunity to learn from the experience of all aviators, military and civilian—not just the aviators in this squadron, group or wing. Good luck.

C. T. Corcoran

C. T. CORCORAN
LTCOL USMC

LIFT and DRAG


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